DOCUMENT RESUME

ED 149 608 FL 009 173

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TITLE Final Report of the Compton Unified School District's Title VII Bilingual-Bicultural Project: September 1969 Through June 1975.
INSTITUTION Compton City Schools, Calif.
PUB DATE Sep 75
NOTE 130p.; Parts may not reproduce clearly due to print quality of original

EDRS PRICE MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS *Academic Achievement; Achievement Tests; Biculturalism; *Bilingual Education; Bilingualism; Bilingual Students; Community Involvement; Demography; Economic Factors; *Elementary Secondary Education; Instructional Materials; Language Tests; Material Development; Mathematics Instruction; Parent Participation; *Program Effectiveness; *Program Evaluation; Reading Achievement; Social Factors; Socioeconomic Influences; *Student Evaluation; Student Needs; Teacher Education; Test Results

ABSTRACT

This evaluation of the Compton, California, 1969-1975 Bilingual-Bicultural Project begins by describing the demographic and socioeconomic features of the school area and its need for the bilingual approach. Summaries of the evaluation reports prepared at the end of each year are presented. Summaries include descriptions of the experimental design. These reports focus on measuring changes in children by means of language, reading, and math achievement tests. Following the report for the last year, a general overview of program effects as related to changes in children is presented. The report concludes with a discussion of each of four basic components: instruction, acquisition and development of materials, staff development, and parent participation and community involvement. A reference bibliography for bilingual-bicultural education follows this discussion. (CLK)

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FINAL REPORT OF THE COMPTON UNIFIED SCHOOL DISTRICT'S TITLE VII BILINGUAL-BICULTURAL PROJECT: SEPTEMBER 1969 THROUGH JUNE 1975

Prepared by Dr. Carolyn Stern, Evaluator

for

Dr. Frank Goodman, Project Director

September 1975

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NATIONAL INSTITUTE OF EDUCATION

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ACKNOWLEDGEMENTS

We feel that a great deal more was accomplished than is reflected in our tables of achievement results. A community was mobilized to serve the needs of minority children. Many became aware for the first time that the potential growth of these students had never been tapped by traditional schooling practices. The total ambience in the target school has undergone a tremendous change. Other schools in the District have also become aware of the values of bilingual education.

None of this could have happened without the dedication of a great many people. We would like to express our admiration and appreciation for all the bilingual staff - teachers, aides, secretary, parents, and friends - who worked so hard to make this program effective. The cooperation of George Lash, Principal, and the colleague teachers were extremely important in attaining the goals of the program.

We would also like to thank Ms. Willa Gupta for her assistance in the evaluation efforts. During 1972-1973 she took on the major responsibilities of the Evaluator during the latter's absence. Her perspicacity in setting up the data analyses for the subsequent years as well has been invaluable.

Carolyn Stern, Evaluator

Frank Goodman, Project Director

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Final Report of the Compton Unified School District's
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Background

Up until quite recently, there was little concern for the special educational needs of the non-English speaking child. This was true for a variety of reasons, but basically it reflected the attitude of the early English-speaking settlers toward immigrants. There were exceptions in some areas. In Milwaukee, Wisconsin, for example, where in 1836 86% of the people were from Germany, children were taught partly or entirely in the mother language. German was adopted as an official subject in the curriculum by the school board in 1857. By 1890, 60% of the students were receiving instruction in German and 10% of the teaching staff were bilingual. When, in 1889, the State legislature passed a law requiring that reading, writing, arithmetic, and U.S. history be taught in English, there was such a storm of protest, primarily from parochial schools, that the law was repealed in 1891.

Subsequent waves of immigrants to this area included many from Poland and Italy, and by 1910 German, Polish, and Italian were taught at all levels between kindergarten and 12th grade. With the advent of the first World War, all bilingual instruction was brought to an end and foreign languages were eliminated from the elementary school curriculum. (From the Bilingual/Bicultural Program Evaluation Report, 1974.)

In other parts of the United States, where there were no similar enclaves of non-English-speaking peoples, the rejection of the immigrant began much earlier. This was based not only on language differences but also on other cultural characteristics such as religion and socioeconomic status. Thus, within the New England-New York area, in the 1850's, many Catholic-Irish immigrant parents attempted to establish sectarian schools where their children could receive the religious instruction banned by the Constitution from the public schools. A number of violent outbreaks, involving actual burning of parochial schools, ensued.

Stronger opposition was expressed toward Southern and Eastern European peoples, with the greatest hostility directed toward those from oriental countries. The first Chinese exclusion act was passed in 1882, and in 1890 the first quota system was established. The implicit bias of the then-majority population toward non-English-speaking immigrants was formalized by the Dillingham Commission of 1907, which overtly labelled the new immigrant as "inferior." The specter of "mongielization" of a mythically-pure Anglo-Saxon heritage was raised long before the advent of Hitler.

Finally, unsupported prejudices were given patriotic justification by the xenophobia engendered during World War I. In 1917, legislation restricted immigration on the basis of ethnic origin, particularly forbidding any further admission of peoples from Southern Europe and Southwest Asia. Some mitigation of this harsh attitude took place after the Armistice, and in 1921 immigration laws were modified to permit limited accommodation from specific, favored countries. The National Origins Act of 1924 reduced annual immigration quotas, basing the number to be admitted on the ratio of nationals already in the country as of 1890. It also specifically excluded all Asiatics from citizenship.

Additional national and ethnic restrictions were established in the Immigration Act of 1952. These remained in force until 1965, when the Reform Immigration Act was signed by President Johnson.

Interestingly enough, many of the immigrants themselves supported the rejection of foreign languages and customs. Refugees from persecution and poverty, the "tired, poor, huddled masses yearning to breathe free" were not loath to shed the external reminders of tyranny and oppression. No where has the vision of what America meant to the downtrodden immigrant been expressed more dramatically than in a play by Zangwill produced in 1908: "...America is God's Crucible, the great Melting-Pot where all the races of Europe are melting and re-forming! Here you stand...in your fifty groups, with your fifty languages and histories, and your fifty blood hatreds and rivalries. But you won't be long like that, brothers, for these are the fires of God you've come to...into the Crucible with you all! God is making the American."

And so the "new American" was encouraged to hasten this process in every way, to complete the metamorphosis as quickly and thoroughly as possible. Both first and family names were "Americanized." Adults attended evening classes in English and citizenship, and school-age children were enrolled in ghetto schools where the babel of tongues was democratically discouraged by the monolingual English-speaking teacher. Parents who sent their children to late afternoon language classes to retain command of their mother tongue were definitely in the minority. Children acculturated rapidly in the public schools. They objected to the additional schooling burden and felt ashamed of the strange foreign customs and language of their parents. Any suggestion that the public school should be responsive to the linguistic needs of these children would have been considered preposterous. As a matter of fact, States in which there was a relatively high proportion

of non-English speaking children passed laws forbidding the instructional use of any language other than English, and the native language was banned even from the school playground. An integral part of this process of proscribing a child's native language was that the entire associated culture was stigmatized and considered inferior. This was particularly true of our indigenous populations of Mexican and Indian origin.

Only gradually did the disastrous effects of our monolingual educational policy, tied to national Anglo-Saxon pride and the concomitant derogation of other languages and cultures, become apparent. In the 1940 Census, over 22 million residents reported that they did not speak English at home. Even more recent statistics indicate that 40% of the population of New Mexico are non-English speaking, as are 20% of the Puerto Ricans in New York and Miami. Scattered throughout the 50 United States are sizable groups of at least 18 other nationalities, speaking a great variety of non-English languages.

Of the non-English speakers identified in 1940, over 73% were of Latin-American lineage, and by far the largest proportion of these lived in the Southwestern part of the United States. During the intervening 35 years, a great deal of research has been carried out on the problems of the Spanish-speaking American. There is a wealth of data documenting the degree of disadvantagement of this sub-group. Publications of the national Educational Resources Information Center (ERIC) list innumerable sociological studies, general and historical articles, and demographic data on instructional and evaluative materials relevant to various non-English speaking populations in the United States.

It is clear from the literature that a major problem is that of developing an educational program which will address the needs of the bilingual child. One of the earliest attempts to design a curriculum

for Spanish-speaking children was launched at the Coral Way Elementary School in Dade County, Florida in 1963, under a grant from the Ford Foundation. This program is described in detail by Gaarder (1965 and 1967), together with the measures used in the final evaluation. Undoubtedly other bilingual approaches were pilot-tested during this period. Rivera (see Smoker, 1967) reports that he was using Spanish for instruction in the first grade in El Paso, Texas as early as 1951. However, the curriculum manual published by the Texas Educational Agency in 1964, in which Rivera was listed as a consultant, clearly describes an ESL (English as a Second Language) pull-out type of program.

The passage of the Elementary and Secondary Education Act in 1967 provided federal aid to schools having a large proportion of economically disadvantaged students. Although ESEA was not specifically intended for the bilingual child, it soon became apparent that a great many economically and educationally disadvantaged children were from non-English-speaking homes. Many administrators interpreted the charge to provide equal educational opportunity to the disadvantaged as applying to these doubly-disadvantaged children. In San Diego, California, the District instituted an ESL/Bilingual project under Title III of ESEA.

Another source of support for bilingual programs was found in Project Head Start. Many of the children enrolled in this preschool program had not yet encountered English. This was especially true of the Indian and Spanish populations of the Southwest area. Native speakers were often employed as aides to help children make the transition to the majority culture school system. It was not, however, until the passage of the 1967 amendment to ESEA, establishing the Title VII Bilingual-Bicultural program, that the needs of minority children were specifically addressed.

Not all opposition to bilingual education is based on ethnic prejudice. A number of educators feel that introducing a child to two languages will result in what psychologists call "interference." This, they fear, could result in a deleterious effect on the learning of both languages, with a consequent retardation of academic progress. In consonance with this theory, several programs advocate the school use of the child's first language until a firm foundation in reading and other subject areas has been established. This type of monolingual program, in which the study of English is gradually introduced as another subject, is also provided under the Title VII aegis.

Other program developers propose to use the child's native language for a major part of the instruction in the early years, but with successively larger proportions of English instruction until ultimately, usually by the fourth or fifth grade, all instruction is provided in English and the native language is "phased out" or relegated to an elective status.

Both of these approaches reflect a concern with the effects of interference, and neither of them is a truly bilingual approach. The first is more aptly described as monolingual but in a language other than English. The second has been called a "transitional" approach, but it has the underlying flavor of a replacement philosophy.

There seems to be no hard data to support the "interference" theory. On the contrary, pragmatic evidence indicates that there are many countries, e.g. Switzerland, Belgium, China, Canada, and Russia, where people speak more than one language as a matter of course, and children are introduced to bilingualism from birth. As a matter of fact, brain researchers (e.g. Penfield) maintain that the uncommitted cortex, which is the locus of the speech and language centers, is

capable of language learning before the age of 10, at which time physiological fixedness sets in. If a second language is learned before this, the necessary functional connections for bilingualism will be set and later language learning will be facilitated. These findings suggest that the second language be introduced before the age of six, particularly if a child is to live in a bilingual environment.

The findings of educational researchers support the physiological position. Landry (1968), after reviewing the literature pointing up the possible deleterious effects of bilingualism, cites the work of Peal and Lambert who have found a positive relationship between bilingualism and creativity. In an experimental test of this hypothesis, Landry found that while in the second grade there were no significant differences in fluency and flexibility on verbal and figural measures of creativity, at the fourth grade level there were significant differences favoring the bilingual group.

With reference to cognitive functioning, the evidence also favors the bilingual child. Liedtke and Nelson (1968) demonstrated that bilingual first grade children did better on Piagetian-type tasks than did monolingual children. They conclude that a bilingual program facilitates the growth of intellectual functioning.

While establishing that a bilingual program is not detrimental, these studies do not provide guidance as to the most effective instructional techniques. Whether one uses one method or another, there is clear evidence that the affective or attitudinal features of the learning situation are of primary importance. Not only is it necessary for parents and students to develop positive feelings of cultural validity and self-worth, but they must also be accepted as equals in the school community.

Guidelines for Title VII Bilingual-Bicultural Programs

While the programs funded under Title VII may vary considerably, the guidelines require that all projects include four basic components: 1) Instruction; 2) Acquisition and development of materials; 3) Staff development; and 4) Community involvement.

Instruction. The first component, instruction, relates to the underlying pedagogical principles which govern a particular program. At some schools these may be very vague, or not articulated in any formal manner. Others may follow highly structured systems. The appended bibliography provides many articles, giving some notion of the range of instructional models, concerned with the development of bilingual curricula.

Andersson (1965, 1966, 1968, 1970, and 1971) has done a thorough job of documenting the work of the Southwest Educational Development Laboratory's Bilingual Education Program, of which he has been the director. He also includes a great deal of information about the historical background of bilingual education in this country. Based on his personal visits, he describes most of the programs which were operative prior to 1970. Although Andersson notes the need for objective evaluations of the various approaches, he does not refer to any specific assessment procedures. Nor does Nedler (1967), who describes the Laboratory's bilingual early childhood model.

In nine Texas programs reviewed by Blanco (1967), there was a wide range of methodology, from all-English to all-Spanish instruction, with many levels of second language usage in between.

Within the past decade, applications of linguistic theory to second-language learning have become more and more prevalent. Usually programs with this type of orientation tend to adopt an English as a Second Language (ESL) or Teaching English to Speakers of Other Languages

(TESOL) technique. The reference bibliography includes many items which document instructional methodology based on linguistic theory. Among these are the reports of Cohen (1970), Golden (1967), Gumperz (1967), Fishman (1965, 1967, and 1968), John and Horner (1971), and Spolsky (1968). Horner (1975) provides an excellent overview of issues in bilingual literacy.

In addition to bilingual models which adhere closely to sociolinguistic concepts, there are many which focus on language and reading but adopt a more eclectic approach. For example, Amsden (1956, 1968, and 1969) describes a program which attempted to raise the reading levels of Mexican-American children at the Malabar School in Los Angeles. A wide variety of techniques, including individualized instruction, curriculum modification, parent participation, and cultural activities, were utilized. The program was adjudged a success in terms of comparatively superior scores on the Stanford Reading Test, the California Reading Test, and two project-designed vocabulary tests. In this respect the report differs from most project evaluations, which are far more likely to be similar to that of the Garfield (1971) subjective summary statement that "The general response and degree of dissemination indicated that the experiment was successful."

Valencia (1969) describes a variety of bilingual models and also points up the need for more effective assessments of individual growth patterns. The National Consortia for Bilingual Education (1971) provides a description of learners in a wide variety of programs throughout the country. Plakos (1967) mentions the development of an instrument to evaluate the effectiveness of bilingual programs, but does not supply any data in his early report and no further work with this measure has appeared. In contrast, Torres (1969), Goodman and Stern (1970), Keith (1969), Jourdane (1970), and Levenson (1971) represent serious efforts to obtain objective

student evaluation data. This is also true for the reports from Hartford, Connecticut (1969), Las Cruces, New Mexico (1970), More Effective Schools, New York City (1968), and New Jersey (1969). Similar types of reports are available for the Michigan Oral Language Series (Lindfors, 1970), the Miami Linguistic Reading Program (Digneo, 1968), the Bilingual Readiness Demonstration Project, New York City (Finocchiaro, 1966), the ERMAS experiment (Hillerich, 1969), TEBRETSOL (Levinson, 1969), and the Language and Reading Education program of the Southwest Educational Development Laboratory (Ott, 1967).

When Arnold (1968), using pre - post gain scores on reading achievement and intelligence tests, found significant differences in the first grade but not in the second, he attributed the results to the fact that the first grade teachers, being in the second year of the program, had had more extensive experience with the methods and materials. Obviously an adequate assessment of an educational program must look at the input variables, the instructional process, as well as the outcome variables, more broadly conceived than simply student academic achievement.

Acquisition and Development of Materials. With reference to the second component, several publishers have developed sets of instructional materials specifically for bilingual programs. Many of the early projects referred to above had active materials development efforts. Where level of funding and continuity of support were favorable (e.g. at SEDL), products were field-tested and ultimately made available for commercial dissemination. Barnes (1969) published an annotated bibliography of materials available for classroom use with Puerto Rican children; Gonsalvos (1971) compiled a collection of Spanish materials for children in kindergarten through sixth grade; Griffin (1970) lists multi-ethnic books for young children; Ibarra (1969) has over 400 references to books, articles, and instructional realia for teachers and students in bilingual classes.

The Latin American Productions of Los Angeles, California have published sets of selected children's literature and learning charts (1968), and Wall (1971) at Project BEST has prepared a two-part bulletin listing a variety of sources of audiovisual aids and instructional materials for use with Puerto Rican children. Many of the descriptive and evaluative reports cited in the bibliography will also have suggestions for preparation and/or purchase of appropriate materials for bilingual instruction.

With the growing stabilization of the Title VII support, and the increasing acceptance of the bilingual-bicultural educational concept, several textbook companies have become aware of the possibilities in this new market and have begun publishing Spanish language scope-and-sequence readers and workbooks in various subject areas. For example, Addison-Wesley will be offering materials to parallel the Children's Television Workshop Spanish language versions of Sesame Street and the Electric Company. Also, three of the Regional Laboratories in the Southwest area - the SouthWest Regional Laboratory in California (SWRL), the Southwest Educational Development Laboratory in Texas (SEDL), and the SouthWest Cooperative Educational Laboratory in New Mexico (SWCEL) - are making available through commercial publishers the bilingual materials which they have been developing and field testing over the past five-to-ten years.

Staff Development. Extensive experience in intervention programs, such as Planned Variations in Head Start and Program Models in Follow Through, have made it painfully clear that the most brilliant program is only as effective as the teacher who implements it. Thus, while a charismatic Project Director can stimulate and provide inspiration and materials, the ultimate success of the program depends on the dedication

and quality of the teaching staff. It is therefore not surprising that staff development is an integral requirement of every Title VII program.

A great deal has been written on the subject of teacher training and the special preparation of paraprofessional community aides for work with bilingual children. There have been numerous EPDA Institutes for teachers and teacher aides. Reports of several of these have been referenced in the bibliography. Bordie (1969), Carter (1969), Erickson (1968), Fitzpatrick (1965), Manuel (1966), Past (1965), Ramirez (1969), and Saunder (1969) are among the early descriptions of programs and rationales for training bilingual personel. Benitendi (1967) and Ulibarri (1970) have published handbooks for teachers and administrators.

The master's thesis prepared by Lopez (1970) was concerned with the recruitment and training of bilingual teachers for Mexican American children in California. What seems a rather obvious point, but one well worth making, is that there is a strong positive correlation between the size of funding of a program and the amount expended for staff development. Lopez also notes that a great deal more work needs to be done in the areas of linguistics, evaluation, and human relationships. Other investigators have emphasized the need to address issues of intergroup conflict, cultural pluralism, and rigidity and depersonalization in the public schools.

Lynch (1969) describes a program to prepare educational administrators to become community change agents. Unfortunately, the 10 fellows who received the training in 1964 were no longer serving as public school administrators in 1968. This is typical of the serious problem of attrition which plagues schools in poverty areas. Obviously staff development is not simply a "start-up" feature of an innovative program but must be a continuous, on-going aspect of the bilingual education model.

Parent Participation and Community Involvement. The fourth major component of a Title VII program is the opening up of the schooling function to embrace responsible participation by parents of the children in the program as well as members of the local indigenous population. Evidence compiled by Berney and Eisenberg (1968) clearly shows that bilingual programs improve community involvement. Lane (1971) reports that the influence of the intercultural preschool experience extends outward into the total multi-ethnic neighborhood.

The importance of a cooperative relationship between the school and community is even more critical when the learners are speakers of other languages (Finocchiaro, 1969; Olstad, 1969). In addition to their curriculum development work, two of the Southwest Regional Laboratories (SEDL and SWCEL) have expended a great deal of effort in staff development and community involvement. The Early Childhood Education Learning System (SEDL, 1969), which includes both these components, provides experimental evidence that parents who participate have a more positive attitude toward education. The SWCEL Basic Program Plan (1970) emphasizes the role of parents as change agents.

In addition to their direct impact on school programs, parents are highly influential in their children's academic progress through motivation and modeling. Understanding of these processes is fostered through the bilingual program. Many investigators (e.g. Gardner, 1968; Gordon, 1969; Mangano and Towne, 1971; Stedman and McKenzie, 1969; and Taylor, 1970) find the antecedents of school achievement in family variables such as family constellation, parental language patterns, child-rearing attitudes, and parent attitudes toward education.

Establishing positive attitudes and active involvement patterns among families who have been traditionally excluded from school

decision-making, even visitation and classroom observation, is not an easy matter. It requires a great deal of planning and effort by all the project staff. Picchiotti (1969) reports that their Bi-Lingual Center has been enthusiastically received by the Puerto Rican community, but that the Mexican population, while approving the program, resents the failure to provide a similar center in their neighborhood. Also, both groups resent the fact that the program is available only to children of poverty families, and not to all those who need it. An Open House held at the Center was well attended by community leaders, but not by the parents. The investigator offers the explanation that "the parents are happy with the Program and do not feel the need to come to the school." This reaction has been reported in other studies. It reflects the first stage of progress in establishing a meaningful parent-school relationship. But it cannot be considered as evidence of a successful parent component. As with staff development, there needs to be constant renewal of an enthusiastic and active level of parent activity.

Evaluation of Title VII Programs

An essential requirement of all federally-funded compensatory education programs is that there be an evaluation of all the features of the innovative effort. This means that there should be an assessment of both input and output variables. Unfortunately, instruments or techniques for process evaluations are not readily available; those which do exist are costly to administer and difficult to analyze. Consequently, the most frequent approach to evaluation of educational experiments is in terms of changes in children. Here there is no lack of instrumentation; rather the problem is one of selection.

Many of the evaluation reports cited in the bibliography indicate some type of objective measure of academic achievement. The need for

assessment in various national programs, such as Head Start, Follow Through, and Title I, has focussed the efforts of highly qualified specialists in educational measurement on the development of valid and reliable instruments for determining levels of cognitive and affective growth. At the Educational Testing Service in Princeton, New Jersey, the United States Office of Education has established an ERIC Clearinghouse specifically for the compilation and dissemination of information about new test development. The Center for the Study of Evaluation at UCLA has developed a system for evaluating tests and has published manuals for elementary and preschool-kindergarten levels. Johnson and Bommarito (1971) have published a handbook on Tests and Measurements in Child Development, covering a great many unpublished instruments.

Most of the available measures are inappropriate for children from culturally-different language backgrounds. Often they produce misleading information, and they are generally criticized. During the past decade there has been a concerted effort to provide the means for more adequate assessments. Project BEST in New York City and the Multilingual Assessment Board in Stockton, California have reviewed tests for this population. And the National Consortia for Bilingual Education has published a list of tests used in 72 Title VII programs. Additional lists of tests are referenced in the bibliography, and there are also sections of books devoted to this vital area (e.g. see John and Horner, 1971). Burt, Dulay, and Hernandez (1975) have published a Bilingual Syntax Measure for assessment of oral language production, but the work of Cervenka (1968) and Manuel (1963), although far from completely adequate, still seem the best available for the non-English-speaking child. It is unfortunate that the pressure for accountability has compelled bilingual project managers to assess the efficacy of programs before the

necessary tools had been devised and tested.

Evaluation of the Compton Bilingual-Bicultural Program

Although we have been aware of the need to assess objectively all the bilingual program components according to the Title VII guidelines, the constraints of time and budget allocations have made it impossible to implement a full-scale evaluation. Over the years we have learned that it is unrealistic to expect that rigorous experimental control can be maintained over an extended period of time in a large school system. Each year has seen its share of unique problems, as well as those recurring ones which are an inherent aspect of the local situation. For this reason we have decided on the following format for the documentation of the program.

To begin with, we shall describe the demographic and socioeconomic features of the school area and its need for the bilingual approach. We shall then abstract the evaluation reports prepared at the end of each year, beginning with the initial 1969-1970 program. In these reports we have focused on measuring changes in children, using language, reading, and math achievement tests, primarily. After the report for the last year (1974-1975), we will present a general overview of program effects as related to changes in children.

At the end of the year-by-year reports, we shall look at each of the four basic components: instruction, acquisition and development of materials, staff development, and parent participation and community involvement. For the most part these will be subjective and anecdotal accounts, using information assembled by the Project Director, Dr. Frank Goodman, and presented in the yearly Continuation Proposals, and reports submitted by the project's Auditor, Dr. Jose Martinez. Copies of these documents are on file with the District office, and also in the United States Office of Education.

Needs Assessment: According to the Mexican American Education Study published by the United States Commission on Civil Rights (1971), there are more than two million Spanish surname students attending public elementary and secondary schools in the continental United States. These comprise 4.6% of the total school enrollment and 23.1% of the minority public school population. About 70% of this group (1.4 million) attend public schools in the five Southwestern States, and nearly 50% of this number are in the State of California. Within California, most of the Spanish-speaking students are in the southern part of the State, centering around Los Angeles. Three counties (Los Angeles, Fresno, and Santa Clara) contain about 50% of the total.

In the Compton Unified School District, over 50% of the children are from families supported by Aid to Families with Dependent Children (AFDC) funds. For all students in Kindergarten through 12th grade, over 98% are from ethnic minority families. Of these, 88% are Black and 10% are Mexican American. There is a wide discrepancy in the population distribution at the elementary and secondary levels. In the elementary schools, 13% of the children are from Mexican-American families. This drops to 6% in junior high and 5% in senior high school. There is reason to believe that this reflects the high drop-out rate for Mexican-American students. An important contributing factor is that approximately 6% of this group have either limited or no English language facility.

A comprehensive and detailed picture of the nature and magnitude of the poverty of the community and the educational deficits of the school population was prepared for the California State Department of Education by the Los Angeles County in fiscal year 1973 to 1974. The relevant statistics are presented in the Continuation Proposal for 1974-75. Briefly, the student profile section indicates that all children, from kindergarten

to 12th grade, are well below grade level, failing to perform as well as could be expected from their I.Q. scores. However, it is important to note that the children in the first and second grades, many of whom had been in some type of federal program, were considerably more proficient in reading than children in the same classes the previous year. Of particular concern was the finding that almost 75% of the children in grades 4 to 6 and 91% of those in grades 7 to 9 are lacking in motivation to succeed in school.

The information presented in the County report applies to the total Compton school community. While it includes the Mexican-American population, it does not provide specific descriptors of the Spanish-speaking students and their families.

Socioeconomic Features. The borders of Compton are contiguous with those of the Watts community, and share many of the same needs for special assistance. With approximately 98% of the school population made up of students from minority racial and ethnic groups, there is a high degree of de facto segregation. The economic plight of the community is desperate. There are few large businesses or industries to provide job opportunities or a source of revenue for the support of the schools. While the national unemployment rate was cited as 8.5%, the comparable figures for Compton were over 20%.

The map on page 19 shows the approximate location of the project school. It is an inner city school serving a sizable Mexican-American, Spanish-speaking barrio. Several small factories and shops line the main arteries, while the cross streets have wooden one-story homes. Many of these have well-kept lawns enclosed by picket fences. Although two railroad lines run in close proximity to the school, they no longer provide transportation to the community. Formerly, the Pacific (Red

*Approximate location of bilingual project school.

Car) Electric System gave easy access to Los Angeles city and port, but this service has long been discontinued. The area has been designated by the State of California as a "hard-core poverty area of high social unrest."

At the initiation of the program, the target school had a total enrollment of 629, of whom 444 were Spanish-surnamed. The physical facilities were very limited. The plant consisted of single-story disconnected buildings and a treeless asphalted area with no permanent playground equipment. The bilingual kindergarten class was located across from the school office, with access to a small play area separated from the one used by the rest of the school. The classroom was shared with the afternoon kindergarten, which constituted the comparison group. Several months after the program was under way, a trailer was brought onto the school grounds to serve as an office for the bilingual program director and staff.

Summary of the first year (1969-1970) report.

Experimental design. To begin with, it should be emphasized that at no time did the evaluator have any input into the assignment of students to either the experimental or comparison classes. Before student selection took place, all Spanish-surname children in kindergarten and first grade were given the Student Evaluation Scales for listening, comprehension, and speaking, and the Madeline Thomas Completion Stories in Spanish as screening devices, and those with the least facility in English were given preference. The tests and screening were carried out by the bilingual teachers and final assignment of students to classes was made by the school principal.

There were 19 kindergarten and 18 first grade children in the bilingual program, and 19 kindergarten and 21 first grade children in the control classes. The teachers of the latter groups were monolingual in English, but each had a Spanish-speaking aide. Furthermore, they

received in-service training in the bilingual techniques and shared many of the same materials. The control kindergarten class was held in the same classroom, in the afternoon, as the bilingual kindergarten had convened in the morning. It was therefore not unexpected that a great deal of diffusion of the bilingual ideology took place. Several of the regular teachers began to take instruction in the Spanish language.

Because of a number of problems encountered in getting the program under way, pretesting did not begin until the middle of October. Also, due to inadequate staff availability at the outset, the test administration was spread over a two month period. On the average, there was a seven month interval between the pre-post test administrations for kindergarten children, and less than five months for the first graders.

The delay in getting started meant that there was a comparatively short period in which the program was fully operational. It also meant that the pretest score did not reflect the true level of the children's language performance at school entry. Although covariance analysis was used, the statistical adjustment does not adequately compensate for these discrepancies.

First year findings. In spite of the various problems associated with establishing the program under short lead time, the effectiveness of the bilingual instruction was conclusively demonstrated on two measures of language functioning given in both English and Spanish: the Peabody Picture Vocabulary Test and the Stern Expressive Vocabulary Inventory. The PPVT requires the child to point to one of four pictures, identifying the one which represents a noun or verb given by the examiner. It is a measure of receptive language, that is, it reveals the words the child understands and can respond to, even though he might not be able to produce the word himself if he were asked to provide a label for an

object or action. Since progress in both English and Spanish was to be assessed, the test had to be given in both languages. No standardized Spanish version of the PPVT was available, so a translation was made by the Project Director in consultation with the two bilingual teachers.

On the pretest, the kindergarten children knew none of the English words, while the scores of the first graders ranged from 0 to 47, with a mean of less than 18 correct responses. This is about the level of an average two-year-old child from a middle-class, English-speaking environment. Performance was also considerably below normal when the same test was given in Spanish. The average score of the kindergarten children, who were approximately five and a half years old at the time, was equivalent to that of the English-speaking two-year-old. There was a narrow range, from a low of 26 to a high of 55.

Even more surprising was the fact that the first grade children performed no better in Spanish than they did in English, and that they were less competent in Spanish than the kindergarten children. Since we assumed that the first grade children were from the same general population, we inferred that the emphasis on English during their kindergarten year had depressed their somewhat limited command of Spanish. We speculated that the introduction of English without the continuing use of Spanish might have interferred with the ability to handle either language. This initial disadvantage was gradually over come, so that for the last year (1974-75) the scores for the first graders were consistently higher than those of the kindergartners.

At the end of the first year, the growth in language between pre- and posttest for the children receiving the bilingual program was literally phenomenal. From a zero pretest score, the average six-year-old child achieved a posttest score comparable to a seven-year-old English-speaking child. There was a wide range of performance among the individual students

on the English PPVT, from a low of 35 to a high of 84. Part of this variance was attributed to the fact that the children continued to enter the experimental class over the entire school year, with one completely non-English-speaking child entering just one month before the end of term.

It was difficult to explain the tremendous gains made on this test. Whatever the reason, our findings pointed up the need to be extremely cautious in drawing comparative inferences from non-standardized translations. On the Expressive Vocabulary Inventory, there was only an insignificant difference whether the children were asked to give an English or Spanish label for a pictured item. In terms of pre-post gains, however, the bilingual classes were consistently superior to the controls. The kindergarten children gained more than did the first graders, and girls more than boys, regardless of treatment or grade.

Summary of the second year (1970-1971) report.

Experimental design. During the course of the first year of the program (1969-1970), we found that there was a great deal of interaction among both teachers and children in the experimental and comparison groups. This diffusion of the project philosophy and activities could be considered a measure of the success of the program. Additionally, while the principal understood and sympathized with the need for experimental rigor in the random assignment of students to treatments, he felt that it would be difficult for him to justify to parents why certain children were given what might be considered "preferred" treatment while other children, equally lacking in English facility, were not. As far as he was concerned, all children should be given the best instruction available in his school.

To avoid conflict of interest, the project officers decided to select a control group in another school located in the same area and drawing from a similar ethnic population. In that school the kindergarten, first, and

second grade class with the greatest number of non-English-speaking children were designated as the comparison groups. No bilingual program had been established at this school. Over the course of the year, however, we learned that the limited-English-speaking children in the kindergarten and second grade were attending special ESL classes.

At the project school, the two bilingual teachers who had been in the first year of the program continued to teach the same grade levels, so that a second grade teacher had to be selected to work with the first year's first grade students. Toward the end of the preceding year, the district had become unified with two adjacent systems, and a consequent reorganization and reassignment of tenured personnel took place. A secondary level teacher of English to English-speaking students was appointed to the second grade bilingual classroom. The teacher was not happy with this placement, nor was the Mexican-American community pleased to have a non-Spanish-speaking person as the bilingual teacher. After a concerted effort by the parents, the secondary teacher was replaced by a Spanish-speaking substitute until a permanent assignment could be made.

Several months passed without a regular teacher being found for the bilingual second grade. Finally, a meeting was arranged with the project director, the evaluator, community representative, and principal. In a joint process of exploring various possibilities, we learned that there was a new teacher, a young man of Mexican-American background who had originally expressed interest in teaching in the bilingual program, assigned to teach an intermediate grade at the target school. When the principal was convinced of the urgency of the situation, he agreed to revise his staffing plan and ask this teacher to take the bilingual class.

Although the new teacher was of Mexican-American descent, his schooling and acculturation had taken place under Anglo-oriented auspices

and he had virtually suppressed his native language. He had had no training for the primary level, nor in bilingual methodology. While he was enthusiastic and cooperative, it took a period of intensive work with the project director to inculcate the necessary ideology and skills. Eventually he became one of the most effective teachers, but the beginning of the second year was a difficult one for the children in that second grade class.

A somewhat reversed situation prevailed in the kindergarten. The teacher for the first half of the year was one who had been involved in the development of the bilingual program from its initiation. Because of personal considerations, she left the classroom in January. Although an excellent replacement was available, and there was sufficient time to make a smooth transition, the disruption of teacher continuity most likely had a deleterious effect on student progress.

The kindergarten and first grade children were pre- and posttested with the Goodenough Draw-a-Man test, the Expressive Vocabulary Inventory, and the Inter-American Oral Comprehension Test. These were administered in English and Spanish by the bilingual teachers and aides. The second grade children received only the Inter-American General Ability and Reading tests in Spanish. It was expected that they would receive the regular achievement tests administered by the District to assess progress in English. This did not occur, since the District elected to test only a sample of the second grade classes and the bilingual class was not included. Thus no comparison of performance on standard English language tests could be made at the end of the second year.

Second year findings. The Goodenough and the EVI had been administered to provide some continuity with the first year's testing. However, the data obtained cast serious doubt as to the validity of the former as a test of bilingual program effectiveness. The EVI, which had really been

designed for prekindergarten and kindergarten children, did not offer sufficient ceiling for the older children. Both of these tests were dropped from the battery and the Inter-American series, which offers continuity through the elementary grades, was adopted as the primary assessment measure. The Preschool level of the General Ability test was given to the kindergarten children, while the primary level was given to both first and second graders. Both of these tests have a maximum score of 80 points, with 25 oral vocabulary items, 15 number items, 20 association and 20 classification items. A major disadvantage of the I-A is that no norms, percentiles or grade equivalents, are available and hence raw scores have to be used. It was clear from the data that the difficulty levels of the two tests are not comparable, and so raw score comparisons between the preschool and primary tests cannot be made.

Only the children in the first and second grades received the I-A Reading Test. This test, given in Spanish, provided strong evidence supporting the value of the bilingual curriculum. Both experimental classes were superior to the controls at the .001 level of confidence. The second grade experimental group gained 13 points from pre to posttest, while the first grade showed a 23 point improvement. The absence of an appropriate bilingual teacher for the first four months of the school year, in addition to the fact that these children had demonstrated limited facility in Spanish compared to the kindergarten children during the first year's evaluation, undoubtedly placed these children under a handicap from which they did not have time to recover. There was no evidence of difference in Oral Spanish Comprehension, but the children in the bilingual program improved significantly in Oral English Comprehension whereas the control children made little measurable progress over the year.

Although all the children who had been in the 1969-1970 bilingual program were kept together and promoted as a group into the next higher

grade, only 13 of the first year's kindergarten children and 14 of the first graders were in the first and second grade in 1970-71. Since it was unrealistic to expect the school to carry a class of only 13 children, the experimental classes were brought up to acceptable class size by adding children with similar backgrounds. Usually these were children who were new arrivals to the United States. Many of these children not only had little facility in English but had never attended school before coming to the States. They were also, on the average, older than the original experimental population at that grade level. Although on the pretest there were significant differences between these two groups, no measurable differences were obtained on the posttest. While this finding may be used to adduce the "catch up" effectiveness of the program, other inferences can be drawn. Observation in the classrooms indicated that bilingual teachers and aides spent more time working with non-English and limited-English students. This was obviously necessary, but it meant less time was available for the ones who had already begun to make progress. Furthermore, as children in the bilingual program became minimally proficient in English they were transferred into regular classrooms to make room for children who were in more urgent need of help.

Summary of the third year (1971-1972) report.

Experimental design. A basic change in the experimental design for the third year was necessitated as a result of a new interpretation of the Title VII program. Up to this point, the underlying purpose and rationale was conceived as being to promote the academic progress of children from non-English-speaking families. Accordingly, only children with little or no command of the English language were considered eligible for participation. This resulted in a type of segregation which was contrary to federal guidelines. Of even greater significance, however, was the fact that this

selection procedure failed to promote the facilitation of communication and understanding among members of different cultures.

Implementing the change in the program meant that half the students in each of the bilingual classes at the three grade levels had to be arbitrarily assigned to a class with a sufficient number of English-speaking students to bring the class up to required size. There is some reason to believe that placement of the bilingual students was based primarily on alphabetic order. However, it is quite likely that the new children assigned to these classes were not randomly selected. In the first place, parents were given the option of determining whether their English-speaking children would be placed in the bilingual class. After responding to these requests, the principal determined, according to unspecified criteria, who else would be among those selected. Again it should be noted that neither the project director nor the evaluator had any input in this process.

As could be anticipated, a great number of problems resulted in the course of implementing the new design. Perhaps the most difficult modification for the bilingual teachers to accept was the fact that they were no longer responsible authorities of their own classrooms. Instead, they were given the role of "floaters" assigned to the bilingual component in the two newly-formed classes at each grade level, in which the "regular" teachers held administrative control. Instead of the bilingual program being an integral part of the total day, one class received the bilingual program in the morning and the other in the afternoon. Although it was obvious that the difference in the time of day injected an important confounding variable, and that it would be desirable to balance the presentation time over a regularly planned schedule, the logistics of school operation made this unacceptable.

Over the course of this third year a great deal of time and energy was diverted to developing a colleague relationship among the regular and

bilingual teachers and aides. The project director adopted a variety of transactional analysis techniques to foster more open lines of communication and to improve morale, and tremendous progress in reducing hostilities and insecurities was made. While there was no doubt that the program was not operating at maximum effectiveness during 1971-1972, it was hoped that we would be off to a much better start in September, 1972.

To complete the experimental design, in addition to the six experimental classes (two per grade level), a third class at the same grade in the target school was designated as a comparison class to test the effect of diffusion or spill-over from the experimental program. Since we had learned that the control school used the previous year was providing a special program for non-English-speaking children, another school with a somewhat similar population was designated to serve as the control. Two classes at each of the three grade levels were given the pre and posttests. There was thus a total of 15 classes in the 1971-72 evaluation study.

Third year findings. For the third year progress evaluation, all children received the District-administered Cooperative Tests in Reading and Math. The bilingual children at the target school and the control classes at the comparison school received the Inter-American Oral Comprehension, Reading, and General Ability tests in Spanish. Grade 1 received Level I and grades 2 and 3 Level II. The Diffusion classes at the target school were given only the English language tests since we were primarily interested in determining whether there would be an adverse effect on progress in the critical academic subjects of reading and math, especially with the Black children, if part of the day was given over to bilingual instruction.

A major concern of the principal of the target school was whether the Black children in the bilingual classes should be taught Spanish. He felt that these children had sufficient difficulty in acquiring academic

skills in English, and could not spare class time to learn a second language. Thus one major focus of the 1971-72 analyses was to determine whether there were differences in performance among Black and Chicano children within three treatments (bilingual, control, and diffusion) at three grade levels (first, second, and third). The covariate analyses were based on the posttest scores, adjusted for pretest, of the 18 subgroups formed by this design. (There were so few non-Chicano/non-Black children in these classes that they were dropped from the analyses.)

The 1971-72 evaluation report contains many detailed tabular presentations of the scores on the English and Spanish language tests. On the Cooperative Reading and Math tests there seems to be no consistent pattern differentiating Black and Chicano children. Rather, there is strong evidence that the critical factor is class or grade, with some treatment effects. That grade level would be a strong factor is not unexpected; what is surprising is the order of the grade scores. In reading, the Black and Chicano children in the bilingual third grade are significantly lower than any other group, while the three top scorers are second graders: Black control, Chicano bilingual, and Chicano control, in that order. And three of the next four highest groups are first graders: Chicano control, Black bilingual, and Chicano bilingual. Both Chicano and Black children in the diffusion classes, that is, those which received a regular curriculum, ranked from 8th to 16th in the 18 subgroup continuum.

On the Cooperative Math test the covariate analyses showed even stronger class and grade effects. The bilingual second grade, both Black and Chicano subgroups, were superior to all other groupings, while the bilingual first and third grades, also Black and Chicano subgroups, were at the lowest end of the distribution. The three diffusion classes were precisely in the middle, in reverse grade order, that is, first grade

highest, second grade next, and third grade lowest. Within each grade level there was no meaningful difference between Black and Chicano children.

Since we were dealing with raw scores, and there may be some differences in difficulty in the grade level tests, it may be more helpful to look at each grade separately. Here we again see that race is not the critical factor. If we disregard pretest score differences and look only at actual posttest scores, we find that on the Cooperative Reading test for both the first and second grades the children in the bilingual classes (both Black and Chicano) scored well below the control groups, who were in turn well below the diffusion class. A slightly different relationship occurred with the third grade, where the control children (again both Black and Chicano) were well below the bilingual class.

On the Cooperative Math test, in first and third grades, the bilingual and diffusion groups made very similar scores, and both considerably above those obtained by the controls. This was not true for the second grade, where the bilingual classes were below both the control and diffusion groups.

The Inter-American tests were given only to the bilingual and control classes. Again we were looking for differences in performance between Chicano and Black children. Except for the test of Oral Spanish Comprehension, which was the same for all grades, we could not make comparisons across levels. Because there were no standardized statistics, such as stanines, percentiles, or grade equivalents, for the Inter-American Series, we used the raw scores for estimating pre-post gains and for comparisons across treatments. The second and third grades were both given Level II of the General Ability and the Reading test, but the first grade received Level I, which was a comparatively easier test.

On the Oral Comprehension test the Chicano children in the bilingual classes, all grades, were consistently higher than all other groups. The fourth highest adjusted posttest mean score was attained by the Black

children in the bilingual third grade. This was, unexpectedly, followed by the Black children in the second grade control class. The next three groups were Chicano children in the control classes, again in reverse order -- first grade highest and third grade lowest.

If we look at posttest scores alone, we see that the three highest scoring groups were the Chicano children in the bilingual classes. These were followed by the Chicano children in the three control grades. Thus the Chicano children, as a whole, did better than the Black children in Spanish Oral Comprehension, which was not too surprising. What was most gratifying was that the Black children in the first and third grade bilingual classes scored almost twice as high as those in the control classes. This was not true for the second grade, where the Black children in the control group scored significantly above the Black children in the bilingual classes.

On the various subtests of the Inter-American General Ability Test, administered in Spanish, the Chicano children scored consistently higher than the Black children. Within the Chicano group, the children in the bilingual classes were generally superior to those in the controls. Of greater moment, however, was the fact that in many cases the Black children in the bilingual classes achieved scores closely comparable to those of the Chicano controls.

It was difficult to come to a meaningful assessment of the findings of this third year of the bilingual program. Because of the drastic change in the organization of the classes, and the fact that there were frequent changes in teachers, there was an unusual amount of disruption and a wide degree of difference in the quality of instruction in the bilingual classes which did not occur in the control or diffusion classes. An attempt to document some of the process variables which affect the implementation of an instructional innovation was initiated. A great deal of observation data was collected, reflecting a wide range of variation in the curricula

presented and the nature of the child-adult interactions. Although the limited funding available for process analyses made it impossible to carry out an in-depth examination, it was clear that the diffusion group, which received on the whole the highest scores, had teachers and aides who demonstrated the most perceptive and reinforcing classroom behaviors, for the first and second grade classes. The teachers of the third grade control classes received significantly higher ratings than those of the other third grades.

Another area of assessment which was pursued during the third year was that of affective or motivational changes in children. Although an important objective of all innovative educational programs is to increase children's feelings of self confidence and self esteem, this is a particularly important goal for bilingual projects. There is a good deal of evidence that children from minority populations, especially those whose first language is other than English, do develop feelings of inadequacy and a lowered sense of self worth. This has led to impaired motivation, academic failures, and school drop out. A guiding principle of the bilingual approach is the fostering of cultural pride and appreciation of the value of the added dimensions offered by a heritage different from that of the mainstream. Changes in this affective domain are hence even more basic than performance on achievement tests.

Unfortunately, measures for assessing changes of a non-cognitive nature are not very adequate to begin with, but they are even more inappropriate with young children from culturally-different minorities. For the 1970-71 progress evaluation, we attempted to adapt an experimental instrument developed for use with preschool and kindergarten children. Although some differences emerged, older children were sufficiently sophisticated to produce socially-desirable responses, even though these did not truly represent their own feelings or behavior.

During 1971-72, we designed a new measure, the Bilingual Affect Scale, to explore the child's feelings about his own ethnicity and racial identity. The theoretical rationale underlying the construction of the items was that we could not assess feelings directly, but needed to look at the child's knowledge of the characteristic features and familiar figures of his own culture, his preferences, and his perceptions of his parents' feelings about the ethnicity of his friends. We also included items concerned with the child's feelings about school and his expectations for achievement in school. There were two forms of the instrument, which was given at mid-year and at the end of the school year.

Although the Bilingual Affect Scale was prepared under extreme time pressure and administered without adequate pilot testing, it seemed to possess potential for becoming a valuable tool in assessing differences in attitudes of children from Black and Chicano groups. The 1971-72 evaluation report presents the basic data, factor loadings, and descriptions of the three factors on which scores were obtained.

Briefly, Factor I relates to race identification. A high score on this factor reflects a child with a strong sense of cultural identity with the Mexican-American people. Factor II reveals a positive affect for school and a valuing of the school experience. Factor III is related to goal-setting and ability to determine one's own destiny.

Because of the short period between the first and second administrations of the Bilingual Affect Scale, no change patterns could be discerned. It was also evident that a great deal of work would have to be done to prepare this measure for general use. We had neither the time nor the facilities to continue with the instrument development and so the effort had to be terminated.

Summary of the fourth year (1972-1973) report.

Experimental design. At the end of the third year we were compelled to give up the idea of maintaining a control group, even in the loosest sense. From the very beginning, we were aware that we could not randomly assign students to treatments, a basic requirement in an experimental design. Each year, however, we tried to find children from similar ethnic and socioeconomic backgrounds, presumably receiving a "regular" curriculum (whatever that might be), with whom to compare the achievement of the children in the bilingual classes. But the political climate prevailing at this time was one which placed a great deal of emphasis on providing equal opportunities for all children, and appropriately enriched educational experiences for those from minority and/or disadvantaged populations.

In our comparison classes we found a variety of interventions. Several were part of the Follow Through experimental Planned Variations study; a number of classes were receiving Title I assistance, e.g. special audio-visual materials, learning booths, remedial reading consultants, and Spanish-speaking aides. Some classes were able to send non-English-speaking children to an ESL room, while others were conducted by bilingual teachers fully as competent as those in the Title VII program. The preliminary process evaluation, initiated half-way through the third year, also supported the notion that the discriminatory factor was not the label attached to a particular class but the nature of the program and the quality of instruction being delivered to the children.

For these various reasons we decided to confine our assessment to the target school, and to look primarily at the two bilingual classes of the second, third, and fourth grades. At each of these grade levels there was an additional class which was not included in the bilingual program.

Although it was clear that the children in these classes were not comparable in terms of language facility or academic exposure, we decided to use their performance as a yardstick against which to assess the achievement of the bilingual classes. Basically, then, our assessment of student progress consisted in determining whether there were significant changes in pre-post test scores for both groups of children. In addition, we carried out classroom observations to assess the instructional features of the various learning environments.

Fourth year findings. As in the preceding year, growth in reading and math proficiency in English was measured with the District-administered Cooperative achievement tests. The tests given the bilingual program children were scored and individual data recorded before the protocols were turned over to the District office. It was not possible to follow the same procedure for the comparison classes. For these groups the data were processed by two different commercial test scoring services; sometimes percentiles were provided and sometimes grade equivalents. Also, we received no data for the third grade control class, which apparently was not included in that year's test sample. Sketchy though our data was, we were able to determine that the pre-post changes in English and math scores were not notably different for the experimental and control groups.

The only statistic for which pre and posttest values for all grade levels was available was the reading percentile score, based on the norming sample. Raw scores for each administration were converted to percentiles relevant to the test time and grade. When children maintain expected progress from the beginning of the school year to the end, their percentile scores, theoretically, remain identical. Children from poverty areas often do not follow this pattern. Instead they exhibit what has been called a "cumulative deficit" such that the percentiles for posttest scores are

lower than those attained on the pretest. This was not true for the students in the bilingual program, taken as a whole. Not only did they maintain "normal" progress, they even made slight posttest gains. Our general conclusion was that the bilingual children did about as well as those in classes receiving no Spanish language instruction. Apparently the time spent did not interfere with progress in English language skill acquisition.

To maintain some semblance of continuity, the Inter-American tests were again used to assess progress in Spanish. Level II of the General Ability and Reading tests were used for both grades 2 and 3, and Level III for grade 4. Several subtests in the General Ability test are essentially non-language, requiring the child to match pictures in classification, analogy, or association tasks. Similarly, in the math tests, basic number concepts are not tied to knowledge of a specific language. For these subtests, instructions were given in both English and Spanish. Each child could then proceed at his own pace and the scores would represent ability in that cognitive skill, irrespective of language.

Only the children in the bilingual program received the Spanish language tests. As a result of the design revision instituted in the third year, there were a number of Black, non-Spanish-speaking children in these classes. It is interesting that for the second and third grades taken as a whole there are significant gains for each of the subtests. However, if we look separately at the Chicano and Black groups, we find although Chicano children in second and third grades make significant gains on every subtest, the Black children show inconsistent gain patterns. Furthermore, the Black children did not take the subtests in which Spanish language fluency played an important part.

In the fourth grade, as a whole, all children made significant gains on every subtest except one requiring an understanding of relationships. When we look at fourth grade Black and Chicano children separately, we find that the Black children failed to make significant gains on any of the subtests except computation. There was a full point decrement in pictorial reading comprehension, a test requiring Spanish language facility, and only non-significant gains in even those tests requiring no language, such as classification, analogies, and number series.

During this fourth year's evaluation, we also looked at various other features of the program, such as attendance and extent of library usage, in relation to achievement test scores. On the whole, no particularly meaningful insights were attained through these analyses. Children who took out the most books did not necessarily have the highest pre or posttest scores; nor did the children with the best attendance records show the greatest gains. As in the previous year, we noted that performance of children is a function of a variety of factors, many of which we could not control. Later in this report we shall discuss the observation findings, and suggest some relationships between input and outcome variables.

Summary of the fifth year (1973-74) report.

Experimental design. As we reported earlier, at the beginning of the third year each of the three bilingual classes was divided into two separate classes, supplemented with a proportionate number of non-Spanish-speaking classmates. A colleague system was introduced, with the appropriate grade level bilingual teacher and aides spending either the morning or afternoon in Spanish language instruction. Much of this third year was devoted to working out the personality and role-function problems precipitated by the externally-imposed team-teaching arrangement. By the end of the year (1971-72), we were beginning to see a good rapport

emerging. Unfortunately, the rate of teacher attrition was high and none of the same teacher-pairs were present during the fourth year. This same lack of continuity prevailed during the fifth year; even over the course of these two years there were many teacher changes.

While it is true that the general school atmosphere and attitude toward the colleague teacher concept improved over time, there was still considerable resistance to including non-Spanish-speaking children as an integral component of the bilingual program. Gradually a modus vivendi was established, such that there were virtually two classes within the same room when the bilingual team was present. Also, for English language work the small groupings were usually arranged according to ability, which meant de facto segregation by dominant language.

During the fifth year of the project (1973-74) the teachers in the District went out on strike, causing serious disruption in the instructional program. This was considerably augumented by the fact that prior to the actual strike call there had been a lengthy period of agitation and discussion, culminating in the complete deterioration of the negotiation process. The strike itself was a particularly acrimonious one, engendering highly charged emotions which on several occasions broke out into overt violence. Even after the strike was settled and the teachers returned to their classrooms, the atmosphere continued to be extremely tense.

These disrupting conditions were further aggravated by two factors which plague many metropolitan inner-city school districts: decreased enrollment and inadequate funding. Soon after the beginning of the second semester it became generally known that the school budget was several million dollars short and would be unable to meet its commitments without State or Federal assistance. One obvious solution was to close several of the elementary schools, with accompanying cuts in personnel. Rumors of large-scale

staff terminations were rife, creating anxiety and insecurity among both certificated and non-certificated employees of the school system. It was not long before notices of dismissal began to arrive.

Since the bilingual staff were usually the ones who had been hired most recently, they were among the first to be notified. For the members of the bilingual project, the District's financial problems were even more critical because the Title VII funding was in its fifth year and clearly the District would not be able to pick up the salaries of the bilingual aides, and the other costs of running the program, as had originally been planned. During most of the spring term, therefore, there were a series of interviews and meetings to determine the fate of individual teachers and aides. Although a continuation proposal had been submitted to Washington in March, 1974, the days and weeks went by with conjecture and concern and no word was received prior to the close of school in June. Classroom teachers and aides did their best during this trying period, but there is no gainsaying that the accumulated tension and insecurity had a deleterious effect on the instructional program and ultimately on the progress made by the children. These facts should be borne in mind when considering the modest gains made during 1973-4.

It has become increasingly evident in the research literature that large scale educational innovations cannot be evaluated with the same techniques and instruments appropriate for tightly-controlled laboratory experiments. Furthermore, the role of the evaluator, a legislative requisite under federally funded programs, becomes extremely anomalous as the need to take an active participant role in the actual project facilitation becomes more urgent. Finally, the exigencies of the life situation inevitably require basic changes in both program content and experimental design.

Responding to the changing conditions encountered in the delivery of the Bilingual project, over the years our evaluation efforts have moved

increasingly away from the experimental/control treatment context and have become more a documentation of the factors which affect program outcomes. Concomitantly, the testing has been decreased and the statistical operations reduced to a more realistic and unsophisticated level. In line with this approach, the 1972-3 evaluation report attempted to identify a number of process variables which might differentially affect the delivery of the bilingual program. The findings of the preliminary observations revealed wide variations in critical program delivery features, but the limited scope of the study did not provide a sufficiently large population to enable the explorations of the many confounding variables in a statistically meaningful fashion. In any event, the considerable reduction in funds available for the 1973-74 evaluation made it impossible to pursue the investigation of process variables during the fifth program year.

Fifth year findings. To facilitate assessment continuity, the tests used in the third and fourth years were also used in the fifth. The Cooperative reading and math tests were administered in English by the District. For the assessment of Spanish language facility we again used the Inter-American Series, although we recognized that these measures are quite inadequate in both content and norming data. After a thorough search of the literature, and numerous consultations with other bilingual evaluators, we failed to find newer assessment instruments sufficiently superior to the Inter-American to warrant breaking the continuity we had established.

Level II of the General Ability and Reading tests were administered to both third and fourth grade students; Level III was given to the fifth graders. Since there is considerable overlap in the general ability subtests with the reading test, not all of the reading subtests were administered. The third and fourth grades were given the reading comprehension

and speed subtests, which are primarily measures of Spanish language reading ability; the fifth grade was given only the Spanish reading comprehension test.

The vocabulary subtest of the Inter American General Ability test was given only to Spanish-speaking children. The numbers, analogies, and classification subtests, which require no language mediation after the tasks have been presented, were administered in both English and Spanish. No reliable norms, grade equivalents, or percentile scores, were available so raw scores were used in all analyses. The results were presented by grade level rather than by individual classes. Important differences between same-grade classrooms existed, but these were attributable to factors such as teacher personality, time of day of program presentation, variations in classroom organization, cooperation of colleague teacher, and availability and caliber of aides, rather than basic features of the bilingual model.

The major comparisons were therefore made in terms of pre-post changes, using the t-test statistic. In many cases sizable gains had to be attributed to chance rather than systematic treatment effect because of the extreme heterogeneity of the sample. For many of the subtests the standard deviation, which is the basic measure of degree of adhesion to the mean, was equal to or larger than the mean score itself. This wide range in performance within the same class reflects the continuing policy of the school to provide the bilingual experience to students with the least English language competence. Many of these children were from rural areas of Mexico, and had never attended any school, even one in their own native language.

On the English language test of reading ability, the comparison classes were at least one year advanced over those in the bilingual program. This was in sharp contrast to the previous year, when there were only small differences across groups except for the advantage demonstrated

by the fourth grade comparison on the math test. When we look at the record of student attrition and continuity in the program later in this report we will see that there is good evidence for our speculation that as soon as the Mexican-American children began to demonstrate fluency in English they were placed in the regular classroom to make place for the completely non-English-speaking newcomers from Mexico.

The third grade experimental class showed so little gain over the school year that there was a significant decrement in the percentile ratings. The greatest pre-post gains on the Cooperative reading test were made by the Black, non-Spanish-speaking children, who had made extremely low scores on the pretest. This too may be attributed to school policy in selection of children for the bilingual classes. From a school administrator's point of view, it seems desirable to place problem children and children with learning difficulties in classrooms where there is a more favorable adult/child ratio, and where they will have greater opportunity for individual attention. The high standard deviations on the English reading and math tests at all grade levels attests to the wide variation in ability in the bilingual classrooms. There is thus good reason to believe that the bilingual program included a disproportionate number of slow learners in both ethnic categories.

Considerable growth in reading and math was demonstrated by both fourth and fifth grade children, although they were still a good deal below the performance expected at their respective grade levels. The danger of making comparisons on the basis of a single class is dramatically evident in the scores on the fourth and fifth grade math tests. Here the fifth grade comparison group scored at approximately the same level as the fourth grade comparison. Thus, while the fourth grade bilingual classes were one year below the fourth grade comparison, the fifth

grade children in the bilingual classes were performing at about the same level as the comparison group.

Another type of analysis of the 1973-74 data looked at the performance of children in terms of years of attendance in the bilingual program. In all cases, children who had been three or more years in the program were not doing as well on the Spanish reading comprehension test as those who had been only one or two years in the program. We suggested two possible explanations for this consistent finding: either the children were beginning to lose their earlier Spanish facility as they adapted to the majority language, or the more capable Spanish-speaking students were being transferred into regular classes. The latter speculation would be in line with our earlier remarks, indicating that the students remaining longest in the bilingual classes were probably the slowest learners.

Since the third and fourth grade children received a different level of the Inter-American tests than did the fifth grade children, and the data were reported in raw scores, performance on the Spanish-language tests could not be compared across the three grade levels. The fourth grade was superior to the third on the three tests which did not require any Spanish facility. This was as expected. However, contrary to expectation, the fourth grade scored below the third in the test of oral vocabulary. In both cases the children who had been in the program three years did not do as well as the children who had entered one year later. Furthermore, the fourth grade non-Spanish-speaking children showed a significant decrement, confirming our observation of the language-based, de facto segregation in the classrooms.

Progress of the fifth grade children in four of the six General Ability subtests, including those most heavily weighted with the Spanish language factor, was considerably greater than chance. But no significant gains were evident in either analogies or computation, neither of which

required any knowledge of Spanish. Again the children who had had the shortest exposure to the bilingual program seemed to be doing better than those with longer exposure. And, as in the fourth grade, very little progress was made by the fifth grade non-Spanish-speaking children in the acquisition of Spanish language skills.

Final evaluation (1974-1975).

Experimental design. No basic change in the experimental design was instituted for the last year of the bilingual program. We continued our assessment of the six experimental classes, two classrooms each for the fourth, fifth, and sixth grades. A third classroom at each of these grade levels was designated a control class for comparison purposes.

Among the colleague or classroom teachers there was greater stability this year than in any previous year. All six classrooms retained the same teacher for the entire school year. This was also true for the control classes. However, only one bilingual teacher had been in the program before. Two new teachers were employed for the fifth and sixth grades. Since funding had not been approved until after the close of school, the new teachers were not taken on until school opening in the fall and there was no opportunity for any pre-service training. Neither of these teachers had worked in the District before, but one of them had had experience as a bilingual teacher in another state. The sixth grade teacher had never taught before. The Project Director spent a great deal of time and effort working with this teacher. Unfortunately, it soon became apparent that the bilingual teacher role in this program required much more flexibility than could be expected. Working as a "floater," without a classroom of one's one, and having to adapt to teaching with an established teacher is not an easy first-year assignment. In addition, we learned that the teacher was also holding down another position in the evening and could

not devote the extra time needed for preparation and planning to ensure an effective bilingual program.

Toward the end of the first semester it became evident that this teacher would have to be replaced. The two aides who were working with the sixth grade classes, and who had been carrying the major load, continued to provide the bilingual program until another teacher could be found. Even after an appointment was made, the new bilingual teacher was able to handle only one of the sixth grade classes and the aides continued to work with the second sixth grade. Although the colleague teachers were most cooperative, and the aides and the new bilingual teacher were extremely dedicated, the sixth grade program was not quite what it should have been. This is clearly reflected in the performance scores.

All classes were given the Cooperative Achievement Tests in reading and math as part of the District's regular testing program. In addition, the children in the bilingual classes, regardless of grade, were given Level III of the Inter-American Tests of General Ability and Reading. Instructions were provided in Spanish and/or English, as judged appropriate by the bilingual teachers and aides. Only those Chicano children with some proficiency in Spanish (i.e., 61% for the pretest and 67% for the posttest) were given the reading test in Spanish. Evidently none of the Black, non-Spanish children were in this category. Even so, many of the children who did take the Lectura test performed at a purely random level.

Sixth year findings. Since the data for this year have not been presented elsewhere, they are reported here in detail. In Tables 1 through 9 we have provided information as to the performance of the bilingual or experimental classes on the Inter-American tests. Each table gives the scores on the six subtests of the General Ability test separately. Under each subtest heading, the maximum score, that is, the number of items in that subtest, is given. The total verbal score consists of sentence

completion and word relationships; the total abstract score consists of analogies and classification; and the total math score of computation and number series. On the same page are presented the subtest scores for the Lectura, the reading test given in Spanish.

Tables 1 through 3 provide the same type of information for the three grade levels. In each case we have presented the scores for the two classrooms at that grade level. The first two columns indicate the mean scores for all the children who took the test, pre and post. This was necessitated by the fact that not all the children who took the pretest also took the posttest, nor did all the children who took the posttest also take the pretest. The last two sets of columns, subtitled "Pairs," gives the scores only for these children. In most cases there were only small differences between the two groups. On each table the statistics consist of the mean raw score, the standard deviation to indicate the degree of dispersion around the mean, and the t-test of the pre-post gain. This latter figure is a measure of the probability that such a score change could have occurred purely by chance.

Some general guidelines may be helpful here. With reference to the standard deviation, it should be noted that where the value of the SD is small compared to that of the mean, there is a relatively homogeneous sample. If, however, the SD is large we can deduce that there is a wide range of performance on that subtest, with some children achieving very high and others very low scores. For example, in Table 1, the mean posttest score for classroom 4-1 on the classification subtest is 18.3 with a SD of 4.0. This would mean that approximately 67% of the children scored between 14.3 and 22.3, a rather limited range. In contrast, the mean score on the analogies pretest for the same group was 8.1 with a SD of 6.9, providing a range for the middle 67% of 1.2 to 15.0.

INTER-AMERICAN TESTS OF GENERAL ABILITY AND READING

(Level 3 - Form DE)

Tables 1-4: Means, Standard Deviations, and t-Tests[1] by Class and Grade

Table 1. Fourth Grade

Variables		Class 4-1 (All) Pre 32	Class 4-1 (All) Post 30	Class 4-2 (All) Pre 32	Class 4-2 (All) Post 30	Class 4-1 (Pairs) Pre (26)	Class 4-1 (Pairs) Post (26)	Class 4-2 (Pairs) Pre (28)	Class 4-2 (Pairs) Post (28)
Sentence Completion (25)	Mean	7.1	10.2	6.8	8.4	7.1	10.7	6.7	8.8
	S.D.	3.8	4.6	3.4	4.0	4.0	4.5	3.5	3.9
Analogies (24)	Mean	8.1	12.8	8.5	12.7	8.3	13.5	8.6	13.1
	S.D.	6.9	7.5	7.1	7.8	7.0	7.4	7.3	7.8
Computation (26)	Mean	6.6	9.4	6.2	9.2	6.6	9.6	6.1	9.3
	S.D.	3.4	3.1	2.9	3.6	3.6	3.3	2.8	3.8
Word Relationships (25)	Mean	8.1	11.9	9.6	11.9	8.4	12.4	9.7	12.2
	S.D.	4.7	6.3	5.8	6.5	4.9	6.2	5.8	6.4
Classification (26)	Mean	15.5	18.3	15.3	16.3	15.2	19.0	15.3	17.2[2]
	S.D.	3.6	4.0	4.6	4.1	3.7	3.2	4.7	3.2
Number Series (24)	Mean	8.3	11.4	8.4	10.1	8.8	12.1	8.2	10.5[2]
	S.D.	4.4	6.5	5.4	5.3	4.6	6.6	5.2	5.3
Total Verbal (50)	Mean	15.1	22.1	16.4	20.3	15.5	23.1	16.4	21.0
	S.D.	7.4	10.4	8.5	10.0	7.7	10.3	8.6	9.7
Total Abstract (50)	Mean	23.5	31.1	23.8	29.0	23.5	32.5	24.0	30.3
	S.D.	8.0	9.4	10.1	10.4	8.2	8.5	10.4	9.6
Total Math (50)	Mean	14.9	20.8	14.7	19.3	15.4	21.7	14.3	19.8
	S.D.	7.3	9.0	7.7	7.9	7.8	9.2	7.3	8.1
LECTURA (Spanish)	N=	19	16	17	15	(15)		(13)	
Vocabulary (45)	Mean	8.8	15.8	7.5	12.3	9.3	15.9	7.5	12.0[3]
	S.D.	4.6	7.3	4.6	7.0	4.2	7.5	4.8	7.5
Speed (30)	Mean	4.8	7.2	4.5	6.1	4.7	7.3[3]	4.5	5.9
	S.D.	2.7	3.8	2.7	3.2	2.4	3.9	2.7	3.3
Level (50)	Mean	(Not given to Fourth Grade Students)							
	S.D.								

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant differences were found in pre-post scores.

INTER-AMERICAN TESTS OF GENERAL ABILITY and READING

Tables 1-4: Means, Standard Deviations, and t-Tests[1] by Class and Grade

Table 2. Fifth Grade

Variables	N=	Class 5-1 (All) Pre 30	Class 5-1 (All) Post 30	Class 5-2 (All) Pre 32	Class 5-2 (All) Post 37	Class 5-1 (Pairs) Pre (22)	Class 5-1 (Pairs) Post (22)	Class 5-2 (Pairs) Pre (30)	Class 5-2 (Pairs) Post (30)
Sentence Completion	Mean	9.0	10.6	6.8	8.9	8.9	9.8[5]	7.0	9.1[2]
	S.D.	4.3	5.1	3.6	5.0	4.5	4.9	3.6	5.1
Analogies	Mean	12.3	15.0	9.8	14.8	12.5	15.0[3]	10.5	15.6
	S.D.	6.6	7.6	6.7	6.4	6.6	7.4	6.6	5.8
Computation	Mean	11.2	11.4	9.2	11.1	11.0	10.4[5]	9.3	10.9[3]
	S.D.	3.5	4.3	4.6	4.9	3.3	3.8	4.8	4.8
Word Relationships	Mean	10.6	12.5	9.3	11.1	10.9	11.3[5]	9.6	11.3[3]
	S.D.	6.4	6.4	6.9	7.0	6.2	6.3	7.0	7.1
Classification	Mean	14.6	16.5	15.7	17.1	14.7	16.5[5]	15.7	17.9
	S.D.	5.3	4.0	3.2	3.4	5.6	3.2	3.3	2.4
Number Series	Mean	11.5	12.0	10.2	12.5	10.9	10.8[5]	10.8	12.5[4]
	S.D.	6.1	6.6	5.7	6.9	5.6	5.9	5.6	6.7
Total Verbal	Mean	19.6	23.1	16.2	20.0	19.8	21.0[5]	16.6	20.1
	S.D.	9.2	10.4	9.8	11.6	9.8	9.7	9.9	11.5
Total Abstract	Mean	26.9	31.4	25.3	31.9	27.2	31.5[2]	26.0	33.3
	S.D.	10.7	10.4	8.2	8.8	10.9	9.3	8.3	7.1
Total Math	Mean	22.7	23.4	19.4	23.6	22.0	21.2[5]	20.1	23.4
	S.D.	7.8	10.1	9.6	10.7	6.7	8.8	9.8	10.3
LECTURA (Spanish)	N=	9	9	22	28	(4)		(21)	
Vocabulary	Mean	9.9	14.1	9.0	11.9	9.5	14.8[5]	9.0	12.0[2]
	S.D.	6.5	6.6	5.2	7.4	9.6	5.6	5.3	6.2
Speed	Mean	7.3	5.8	4.9	6.9	6.8	5.0[5]	4.8	6.9[2]
	S.D.	4.5	2.6	2.7	3.0	5.9	3.6	2.7	2.9
Level	Mean	12.0	11.7	9.1	11.9	11.8	14.0[5]	9.2	10.0[5]
	S.D.	6.8	5.1	4.5	5.8	7.4	4.8	4.5	5.2

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant differences were found in pre-post scores.

INTER-AMERICAN TESTS OF GENERAL ABILITY and READING

Tables 1-4: Means, Standard Deviations, and t-Tests[1] by Class and Grade

Table 3. Sixth Grade

Variables		Class 6-1 (All) Pre	Class 6-1 (All) Post	Class 6-2 (All) Pre	Class 6-2 (All) Post	Class 6-1 (Pairs) Pre	Class 6-1 (Pairs) Post	Class 6-2 (Pairs) Pre	Class 6-2 (Pairs) Post
	N=	32	27	32	25	(26)		(20)	
Sentence Completion	Mean	10.7	13.7	10.8	10.7	10.5	13.9[5]	11.1	11.2[5]
	S.D.	6.1	10.8	5.0	4.8	6.0	11.0	4.9	5.0
Analogies	Mean	15.8	19.0	16.6	19.0	16.2	18.9[2]	17.5	19.0[4]
	S.D.	7.3	4.9	5.8	3.3	7.2	4.9	4.9	2.9
Computation	Mean	11.8	13.3	11.5	13.4	12.1	13.1[5]	11.3	13.3[3]
	S.D.	5.3	5.1	3.7	4.8	5.0	5.1	3.6	5.0
Word Relationships	Mean	12.2	14.0	12.7	13.3	12.1	14.0[3]	12.9	13.8[5]
	S.D.	6.4	6.3	5.3	6.1	6.3	6.5	5.4	6.7
Classification	Mean	18.8	20.2	17.6	19.2	18.8	20.2[3]	18.5	20.0[4]
	S.D.	3.8	2.8	3.5	2.7	4.1	2.9	3.6	2.1
Number Series	Mean	14.7	15.9	12.9	15.0	14.7	15.8[5]	13.2	14.7[5]
	S.D.	6.5	5.6	6.4	4.4	6.5	5.7	6.7	4.9
Total Verbal	Mean	22.8	27.9	23.5	24.0	22.6	27.9[3]	23.9	24.9[5]
	S.D.	11.8	14.2	9.0	10.2	11.4	14.5	9.2	11.0
Total Abstract	Mean	34.6	39.2	34.1	38.1	35.0	39.1[2]	36.0	38.9[3]
	S.D.	9.4	6.9	8.5	4.1	9.5	7.0	7.7	3.7
Total Math	Mean	26.6	29.2	24.1	28.4	26.8	28.9[4]	24.5	27.9[2]
	S.D.	10.7	9.7	9.3	8.2	10.3	9.8	9.4	8.9
LECTURA (Spanish)	N=	22	20	11	11	1 (17)		(8)	
Vocabulary	Mean	14.5	17.0	17.1	18.3	14.7	18.9	16.4	21.3[3]
	S.D.	8.4	9.0	5.2	8.1	8.1	8.3	5.7	7.0
Speed	Mean	7.7	11.0	9.5	11.4	7.7	12.2	8.8	13.6[2]
	S.D.	5.3	7.5	4.9	6.6	5.7	7.4	4.4	6.1
Level	Mean	12.3	17.2	14.5	19.4	12.4	18.3	14.8	22.0[2]
	S.D.	7.0	8.3	3.8	7.6	6.0	8.4	4.5	6.9

[1]All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant differences were found in pre-post scores.

Since all grades received the same I-A tests, comparisons across grades can be made. For these analyses we use only the scores of children who have had both pre and posttests, and we have summed both classes for each of the three grades. There are a number of differences between the two classes at the same grade, but these are due to teacher differences and other factors quite unrelated to the bilingual treatment, per se. For example, both sixth grade classes show many more non-significant changes between pre and posttest, but the class which had no bilingual teacher at all after the middle of the year had consistently lower scores on the total verbal, abstract, and math subtests. And on the Spanish reading test, although they made higher raw scores, the pre-post gains were less dramatic than those of the class which had the replacement teacher.

On Table 4 we can compare the raw scores on the pre and posttests for each of the grade levels, and can see that, with few exceptions, all classes made gains which were far greater than those which could be expected on the basis of chance alone. All the pre-post comparisons for the fourth grade are such that they might occur less than once per thousand testing occasions. The children in this grade were fortunate to have the bilingual teacher who had been with the program since its inception in 1969. Also, many of the children had been in this teacher's class before, as she had moved from kindergarten to fourth grade over the intervening years.

This excellent record was not duplicated by either the fifth or the sixth grades. We should recall that the fifth grade group, from the beginning, had not performed as well as the other grades. Thus we should not fault the new bilingual teacher, who actually did an outstanding job. The sixth grade, on the other hand, had started the year with good pretest scores, but failed to make significant progress in sentence completion or

INTER-AMERICAN TESTS OF GENERAL ABILITY and READING

Tables 1-4: Means, Standard Deviations, and t-Tests[1] by Class and Grade

Table 4. All Grades and Total Experimental Group

		Grade 4		Grade 5		Grade 6		TOTAL	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Variables	N=	(54)		(52)		(46)		(151)	
Sentence Completion	Mean	6.9	9.7	7.8	9.4[2]	10.8	12.7[5]	8.4	10.5
	S.D.	3.7	4.3	4.1	4.9	5.5	8.9	4.7	6.4
Analogies	Mean	8.5	13.3	11.4	15.3	16.7	18.9	12.0	15.7
	S.D.	7.1	7.6	6.6	6.5	6.3	4.1	7.4	6.7
Computation	Mean	6.3	9.4	10.0	10.7[5]	11.7	13.2[2]	9.2	11.0
	S.D.	3.2	3.5	4.3	4.3	4.5	5.0	4.6	4.5
Word Relationships	Mean	9.1	12.3	10.2	11.3[3]	12.4	13.9[2]	10.5	12.4
	S.D.	5.4	6.3	6.7	6.7	5.9	6.5	6.1	6.5
Classification	Mean	15.3	18.1	15.2	17.3[2]	18.7	20.1[2]	16.3	18.4
	S.D.	4.2	3.3	4.5	2.8	3.8	2.5	4.5	3.1
Number Series	Mean	8.5	11.3	10.8	11.8[5]	14.0	15.3[4]	11.0	12.7
	S.D.	4.9	6.0	5.5	6.4	6.6	5.4	6.1	6.2
Total Verbal	Mean	16.0	22.0	18.0	20.5	23.2	26.6[3]	18.9	22.9
	S.D.	8.1	10.0	9.9	10.6	10.4	13.0	9. 9	11.4
Total Abstract	Mean	23.8	31.4	26.5	32.5	35.4	39.0	28.2	34.1
	S.D.	9.3	9.1	9.4	8.1	8.7	5.8	10.3	8.5
Total Math	Mean	14.8	20.7	20.9	22.5[5]	25.8	28.5	20.2	23.7
	S.D.	7.5	8.6	8.6	9.6	9.9	9.3	9.7	9.7
LECTURA (Spanish)	N=	(28)		(25)		(25)		(78)	
Vocabulary	Mean	8.5	14.1	9.0	12.4[2]	15.2	19.6	10.8	15.3
	S.D.	4.5	7.6	5.9	6.1	7.4	7.9	6.7	7.8
Speed	Mean	4.6	6.7[2]	5.1	6.6[3]	8.0	12.6	5.9	8.6
	S.D.	2.5	3.6	3.3	3.0	5.3	6.9	4.1	5.5
								(50)	
Level	Mean	(Not Given)		9.6	10.7[5]	13.1	19.5	11.4	15.1
	S.D.			5.0	5.2	5.6	8.0	5.5	8.1

[1]All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant differences were found in pre-post scores.

number series. When the raw scores for all the children in the bilingual program are taken as a whole, we find that significant gains have been made on each of the subtests of the I-A General Ability and Reading tests.

Figure 1 provides a quick overview of program effects in terms of performance on the Spanish language tests. The values entered on the graph are based on the raw scores, as reported in Table 4, but converted to percent correct. The bottom of each bar represents the pretest and the top the posttest percent correct figure. The distance between these two points reflects the extent of gain between testings. For the combined verbal subtests, we see that the fifth grade, which started well above the fourth, by the end of the year had actually fallen below the posttest level achieved by the younger group.

It is interesting to see that all three grade levels do much better on the abstract tests (analogies and classification), which involve nonverbal tasks, than they do on the verbal or the math tests. It is difficult to explain the inferior performance on the math tests, which also require little verbal facility.

The performance on the Lectura (the Spanish reading test) shows a normal grade-to-grade improvement, with the greatest pre-post gains made by the sixth graders on the vocabulary subtest. On the whole, scores on the reading subtest do not come up to those attained on the General Ability subtests. We were also concerned that the scores on the speed subtest were so much below the other two reading subtests.

In Tables 5 through 9, we look at the data from the Inter-American tests as a function of years of exposure to the bilingual curriculum. Again, the first three tables look at each of the three grades separately. To facilitate the analyses, we set forth two groupings: those who were in the program for three years or more, and those who had been in two years or less. These are very gross categories, and do not take into

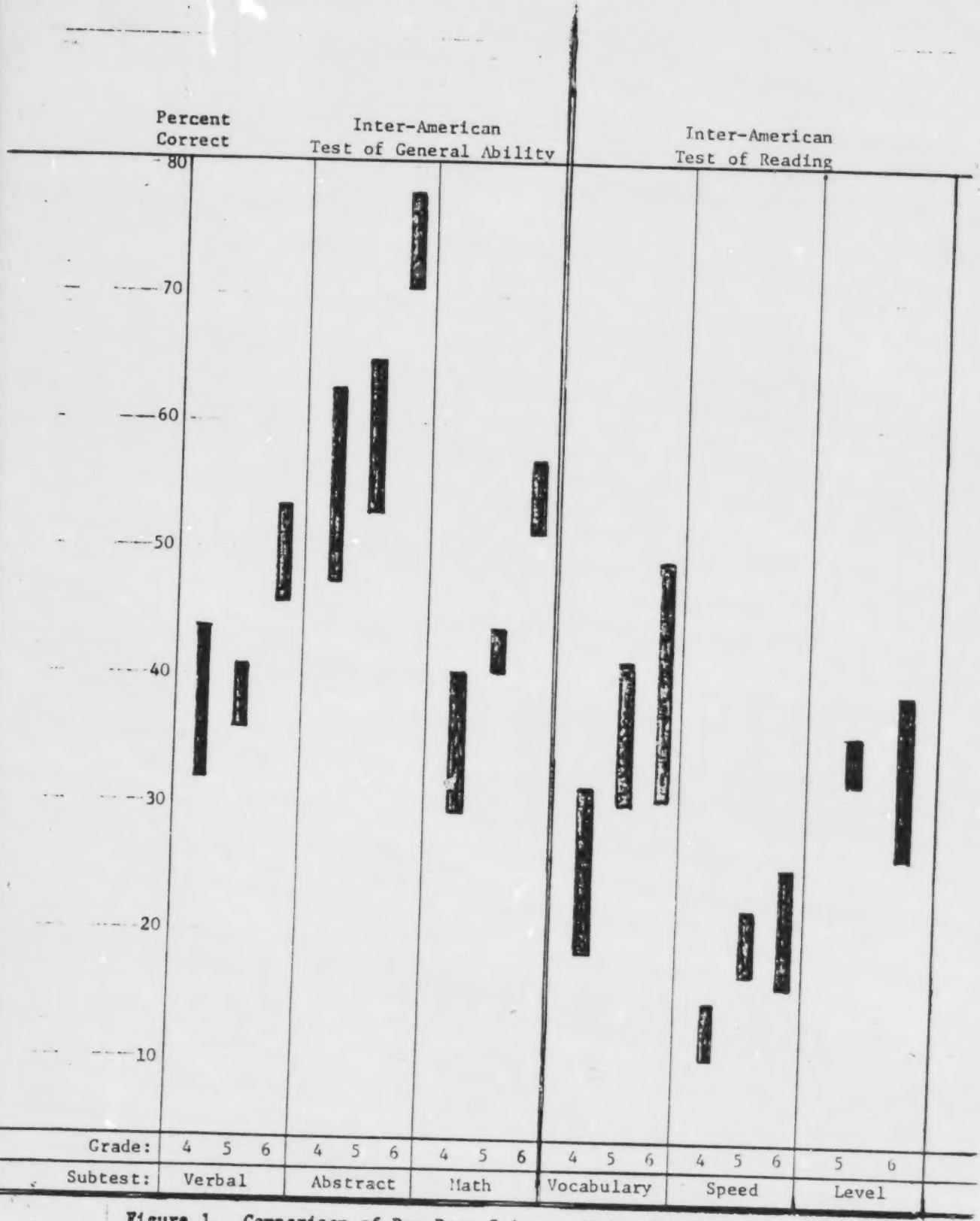

Figure 1. Comparison of Pre-Post Gains on Major Subtests, by Grade. (Experimental Group Only)

consideration the externally-imposed criteria for selecting students to enter or leave the bilingual classes. In most cases there are only chance differences between these two experimental groupings. It is far more meaningful to turn directly to Tables 8 and 9, which present the data for each grade with the two classes per grade level combined.

In the fourth grade the children who have been in the program three years or more generally receive higher scores than do those who have participated two years or less. While these differences are seldom very large, the consistency with which they recur provides evidence for the existence of greater-than-chance effects. The pattern is reversed for the fifth grade, where the newcomers are more apt to attain higher scores than those who have been longer in the program. These are primarily insignificant differences. The only comparison which is statistically reliable is one which favors the groups with longer program exposure. This occurs on the posttest for the level of comprehension Lectura subtest.

The sixth grade classes also show few significant differences based on length of time in the bilingual program. While almost all the General Ability subtests favor the program veterans, only in abstract reasoning is this difference greater than can be found by chance. The findings on the Lectura subtests are quite different. Here the children with less time in the program are consistently superior to those who have been receiving bilingual instruction for three or more years.

If we look at the scores of all the Chicano children as a whole, we find that only on the subtests which involve abstract reasoning is there a reliable difference, favoring the children with the longest period of enrollment in bilingual classes.

Tables 5-9: Comparison of Scores for Students in Program 3 Years or more (E1) with Students in Program 2 Years or less (E2)

Table 5. Fourth Grade

		Class 4-1				Class 4-2			
		Pretest		Posttest		Pretest		Posttest	
		E-1	E-2	E-1	E-2	E-1	E-2	E-1	E-2
Variables	N=	16	16	14	16	15	17	14	18
Sentence Completion	Mean	6.9	7.3	10.9	9.6	7.2	6.4	8.7	8.2
	S.D.	4.0	3.7	5.1	4.2	4.0	2.9	4.3	3.9
Analogies	Mean	10.1	6.0[4]	15.6	10.3[4]	9.8	7.4	12.7	12.7
	S.D.	7.3	6.1	7.0	7.3	7.7	6.6	8.2	7.7
Computation	Mean	6.9	6.2	9.6	9.3	5.7	6.7	8.1	10.1
	S.D.	4.2	2.3	4.2	1.8	2.9	2.9	3.7	3.4
Word Relationships	Mean	8.8	7.3	14.5	9.6[3]	10.6	8.7	12.4	11.6
	S.D.	1.3	1.1	6.1	5.6	6.2	5.4	6.9	6.5
Classification	Mean	16.1	14.8	19.9	16.9[3]	15.3	15.4	17.1	15.7
	S.D.	4.6	2.0	2.8	4.4	4.4	4.9	3.3	4.7
Number Series	Mean	9.5	7.1	12.5	10.4	8.8	8.2	10.0	10.1
	S.D.	5.2	3.1	8.0	5.0	5.9	5.1	5.5	5.2
Total Verbal	Mean	15.7	14.6	25.4	19.3	17.8	15.1	21.1	19.7
	S.D.	7.7	7.2	10.9	9.4	9.6	7.4	10.8	9.6
Total Abstract	Mean	26.3	20.8[3]	35.6	27.2[2]	25.1	22.7	29.8	28.4
	S.D.	8.7	6.5	8.1	9.0	10.6	9.8	10.3	10.7
Total Math	Mean	16.4	13.3	22.1	19.6	14.5	14.9	18.1	20.2
	S.D.	9.1	4.8	11.4	6.3	8.2	7.6	8.1	7.9
LECTURA (Spanish)	N=	11	8	10	6	9	8	9	6
Vocabulary	Mean	9.5	7.9	17.6	12.8	7.3	7.8	12.1	12.7
	S.D.	4.3	5.0	7.8	5.7	4.2	5.3	8.6	4.2
Speed	Mean	4.7	4.9	7.0	7.5	4.9	4.1	5.9	6.3
	S.D.	2.3	3.3	4.3	3.1	3.1	2.4	3.7	2.7
Level	Mean	(Not given to Fourth Grade Students)							
	S.D.								

NOTE: Significant differances between groups were not found unless otherwise indicated. 1 = .001 level; 2 = .01; 3 = .05; 4 = .10.

INTER-AMERICAN TESTS OF GENERAL ABILITY and READING

Tables 5-9: Comparison of Scores for Students in Program 3 Years or more (E1) with Students in Program 2 Years or less (E2)

Table 6. Fifth Grade

		Class 5-1				Class 5-2			
		Pretest		Posttest		Pretest		Posttest	
		E-1	E-2	E-1	E-2	E-1	E-2	E-1	E-2
Variables	N=	18	12	14	16	16	16	18	19
Sentence Completion	Mean	8.2	10.3	9.9	11.2	6.9	6.8	8.8	9.1
	S.D.	4.5	3.7	5.3	5.0	3.6	3.6	5.6	4.5
Analogies	Mean	11.9	13.0	15.1	14.9	11.4	8.3	14.6	14.9
	S.D.	6.5	7.0	6.8	8.5	6.6	6.7	6.6	6.4
Computation	Mean	10.2	12.7[4]	9.4	13.2[3]	9.8	8.6	11.1	11.1
	S.D.	2.8	4.0	4.1	3.9	4.8	4.5	4.7	5.2
Word Relationships	Mean	9.2	12.7	9.8	14.9[3]	8.8	9.9	11.1	11.1
	S.D.	5.6	7.1	6.7	5.3	6.6	7.3	7.3	6.9
Classification	Mean	14.6	14.6	16.2	16.7	15.4	16.1	17.5	16.8
	S.D.	5.8	4.6	3.4	4.5	2.2	3.9	2.3	4.2
Number Series	Mean	11.7	11.2	10.6	13.2	9.8	10.6	12.4	12.6
	S.D.	6.3	6.0	6.0	7.0	5.3	6.2	6.5	7.5
Total Verbal	Mean	17.3	22.9	19.7	26.1[4]	15.7	16.7	19.8	20.2
	S.D.	9.0	8.9	10.8	9.4	9.4	10.4	12.3	11.2
Total Abstract	Mean	26.5	27.6	31.3	31.6	26.8	23.9	32.1	31.7
	S.D.	11.3	10.0	9.0	11.8	7.9	8.5	8.2	9.5
Total Math	Mean	21.9	23.8	20.0	26.4[4]	19.6	19.2	23.6	23.7
	S.D.	7.3	8.8	9.2	10.1	9.4	10.1	10.3	11.4
LECTURA (Spanish)	N=	7	2	6	3	11	11	14	14
Vocabulary	Mean	8.9	13.5	16.8	8.7[4]	8.7	9.2	12.6	11.1
	S.D.	7.0	3.5	6.6	1.2	5.2	5.4	7.3	7.7
Speed	Mean	6.1	11.5	6.0	5.3	4.1	5.7	6.6	7.3
	S.D.	4.4	0.7	3.2	1.2	2.0	3.2	3.3	2.9
Level	Mean	10.1	18.5	14.0	7.0[3]	9.1	9.1	11.4	8.5
	S.D.	6.3	5.0	3.9	4.4	4.9	4.2	6.1	5.4

NOTE: Significant differances between groups were not found unless otherwise indicated. 1 = .001 level; 2 = .01; 3 = .05; 4 = .10.

Tables 5-9: Comparison of Scores for Students in Program 3 Years or more (E1) with Students in Program 2 Years or less (E2)

Table 7. Sixth Grade

		Class 6-1				Class 6-2			
		Pretest		Posttest		Pretest		Posttest	
Variables	N=	E-1 25	E-2 7	E-1 20	E-2 7	E-1 19	E-2 13	E-1 14	E-2 11
Sentence Completion	Mean	10.0	13.0	11.1	21.4[3]	10.9	10.5	11.6	9.5
	S.D.	6.0	6.5	5.2	18.0	5.0	5.1	5.6	3.4
Analogies	Mean	17.9	8.4[1]	20.0	16.3[4]	18.1	14.4[4]	19.1	18.9
	S.D.	5.6	8.5	4.0	6.3	5.3	6.0	3.2	3.5
Computation	Mean	11.8	12.1	13.4	13.1	11.8	11.0	14.1	12.4
	S.D.	5.3	5.6	5.5	4.3	3.6	3.9	5.6	3.5
Word Relationships	Mean	12.2	12.0	14.2	13.9	14.1	10.7[4]	14.2	12.1
	S.D.	7.1	3.7	7.3	2.7	4.7	5.7	7.6	3.6
Classification	Mean	19.5	16.1[3]	20.9	18.3[3]	18.3	16.5	19.9	18.3
	S.D.	2.8	5.6	2.2	3.6	3.7	3.2	2.4	3.0
Number Series	Mean	15.4	12.3	16.1	15.1	12.7	13.2	15.1	14.8
	S.D.	6.3	7.1	5.4	6.8	6.7	6.3	5.1	3.6
Total Verbal	Mean	22.2	25.0	25.3	35.3	25.0	21.2	25.8	21.7
	S.D.	12.5	9.5	12.0	18.1	8.9	9.1	12.5	5.8
Total Abstract	Mean	37.4	24.6[1]	40.9	34.6[3]	36.3	30.9[4]	39.1	37.2
	S.D.	6.6	11.5	5.3	9.1	8.2	8.1	4.3	3.7
Total Math	Mean	27.2	24.4	29.5	28.3	24.5	24.2	29.3	27.2
	S.D.	10.6	11.5	9.9	9.7	9.4	9.4	9.8	5.8
LECTURA (Spanish)	N=	17	5	15	5	8	3	9	2
Vocabulary	Mean	12.6	21.2[3]	15.0	22.8[4]	18.0	14.7	20.0	11.5
	S.D.	7.8	7.5	7.1	12.4	5.3	5.0	8.3	0.7
Speed	Mean	6.2	12.6[3]	9.3	16.0[4]	9.1	10.7	12.0	8.5
	S.D.	4.6	5.3	6.4	9.0	4.1	7.6	7.2	0.7
Level	Mean	11.1	16.6	15.3	23.0[4]	14.9	13.7	20.3	15.0
	S.D.	7.2	4.4	7.4	8.9	4.2	3.2	7.7	7.1

NOTE: Significant differances between groups were not found unless otherwise indicated. 1 = .001 level; 2 = .01; 3 = .05; 4 = .10.

Tables 5-9: Comparison of Scores for Students in Program 3 Years or more (E1) with Students in Program 2 Years or less (E2)

Table 8. Total 4th Grade and Total 5th Grade

		4th Grade				5th Grade			
		Pretest		Postest		Pretest		Posttest	
		E-1	E-2	E-1	E-2	E-1	E-2	E-1	E-2
Variables	N=	31	33	28	34	34	28	32	35
Sentence Completion	Mean	7.0	6.8	9.8	8.9	7.6	8.2	9.3	10.0
	S.D.	3.9	3.3	4.8	4.0	4.1	4.0	5.4	4.8
Analogies	Mean	10.0	6.7[4]	14.2	11.6	11.6	10.2	14.8	14.9
	S.D.	7.4	6.3	7.6	7.5	6.4	7.1	6.6	7.3
Computation	Mean	6.4	6.3	8.8	9.7	10.0	10.3	10.4	12.1
	S.D.	3.6	2.6	4.0	2.8	3.8	4.7	4.5	4.7
Word Relationships	Mean	9.7	8.0	13.4	10.6[4]	9.0	11.1	10.5	12.8
	S.D.	5.7	4.9	6.5	6.1	6.0	7.2	7.0	6.4
Classification	Mean	15.7	15.1	18.5	16.3[3]	15.0	15.5	16.9	16.7
	S.D.	4.5	3.7	3.3	4.5	4.5	4.2	2.9	4.3
Number Series	Mean	9.2	7.7	11.3	10.2	10.7	10.9	11.6	12.9
	S.D.	5.5	4.2	6.9	5.0	5.8	6.0	6.2	7.1
Total Verbal	Mean	16.7	14.8	23.3	19.5	16.6	19.4	19.8	22.9
	S.D.	8.6	7.2	10.9	9.4	9.1	10.1	11.5	10.7
Total Abstract	Mean	25.7	21.8[4]	32.7	27.9[4]	26.6	25.5	31.8	31.6
	S.D.	9.5	8.3	9.5	9.8	9.7	9.2	8.4	10.5
Total Math	Mean	15.5	14.1	20.1	19.9	20.8	21.2	22.0	24.9
	S.D.	8.6	6.3	9.9	7.1	8.3	9.6	9.9	10.7
LECTURA (Spanish)	N=	20	16	19	12	18	13	20	17
Vocabulary	Mean	8.5	7.8	15.0	12.8	8.8	9.8	13.9	10.6
	S.D.	4.3	5.0	8.4	4.8	5.8	5.3	7.2	7.0
Speed	Mean	4.8	4.5	6.5	6.9	4.9	6.6	6.4	6.9
	S.D.	2.6	2.8	3.9	2.8	3.2	3.6	3.2	2.7
Level	Mean	(Not given to 4th grade)				9.5	10.5	12.2	8.2[3]
	S.D.					5.3	5.4	5.5	5.1

NOTE: Significant differances between groups were not found unless otherwise indicated. 1 = .001 level; 2 = .01; 3 = .05; 4 = .10.

Tables 5-9: Comparison of Scores for Students in Program 3 Years or more (E1) with Students in Program 2 Years or less (E2)

Table 9. Total 6th Grade and Total Experimental Group

		6th Grade				TOTAL			
		Pretest		Posttest		Pretest		Posttest	
Variables	N=	E-1 44	E-2 20	E-1 34	E-2 18	E-1 109	E-2 81	E-1 94	E-2 87
Sentence Completion	Mean	10.4	11.4	11.3	14.2	8.6	8.4	10.2	10.4
	S.D.	5.5	5.6	5.3	12.5	4.9	4.5	5.2	7.1
Analogies	Mean	18.0	12.3[1]	19.6	17.9	13.7	9.3[1]	16.4	14.2[3]
	S.D.	5.4	7.3	3.7	4.8	7.2	7.1	6.5	7.3
Computation	Mean	11.8	11.4	13.7	12.7	9.7	9.0	11.1	11.3
	S.D.	4.6	4.5	5.5	3.8	4.7	4.4	5.1	4.0
Word Relationships	Mean	13.0	11.2	14.2	12.8	10.8	9.9	12.7	12.0
	S.D.	6.2	5.0	7.3	3.4	6.2	5.9	7.1	5.8
Classification	Mean	19.0	16.4[2]	20.5	18.3[2]	16.8	15.5[3]	18.7	16.9[1]
	S.D.	3.2	4.0	2.3	3.1	4.4	4.0	3.2	4.2
Number Series	Mean	14.3	12.9	15.7	14.9	11.7	10.0[4]	13.0	12.3
	S.D.	6.5	6.4	5.2	4.9	6.4	5.8	6.4	6.2
Total Verbal	Mean	23.4	22.6	25.5	26.9	19.4	18.3	22.9	22.4
	S.D.	11.0	9.2	12.2	13.5	10.3	9.2	11.6	11.1
Total Abstract	Mean	36.9	28.7[1]	40.1	36.2[3]	30.5	24.8[1]	35.1	31.1[2]
	S.D.	7.3	9.7	4.9	6.2	10.2	9.3	8.6	9.9
Total Math	Mean	26.0	24.3	29.4	27.6	21.4	19.1	24.1	23.5
	S.D.	10.1	9.9	9.7	7.3	10.0	9.4	10.5	9.2
LECTURA (Spanish)	N=	25	8	24	7	63	37	63	36
Vocabulary	Mean	14.3	18.8	16.8	19.6	10.9	10.9	15.3	13.1
	S.D.	7.5	7.1	7.8	11.6	6.6	6.9	7.8	8.0
Speed	Mean	7.2	11.9[3]	10.3	13.9	5.8	6.8	7.9	8.3
	S.D.	4.5	5.8	6.7	8.2	3.8	4.7	5.3	5.1
	N=					43	21	44	24
Level	Mean	12.3	15.5	17.2	20.7	11.1	12.4	14.9	11.9
	S.D.	6.5	4.0	7.8	8.9	6.2	5.4	7.2	8.5

NOTE: Significant differances between groups were not found unless otherwise indicated. 1 = .001 level; 2 = .01; 3 = .05; 4 = .10.

The next set of tables (10 through 27) reports a variety of analyses carried out with scores attained on the California Tests of Basic Skills. The reading and math achievement tests of the CTBS were administered by the classroom teachers under the supervision of the District's evaluation staff. All test protocols were handled in accordance with District regulations, and were scored by commercial test scoring services. When the results were received by the District we were given copies of the printouts for the experimental classes as well as the control class at each grade level.

As with the Inter-American series, the first three tables for the CTBS (Tables 10 - 12) present data for each grade separately. They list the means, standard deviations, and t-tests on the percentile scores for two groups of children within the two bilingual classes of the fourth, fifth, and sixth grades. First we look at the performance of all who took either the pretest or the posttest. Then the significance of the difference between pre and posttest scores is assessed only for those students who were tested at both test periods. These, of course, were included in the computation of both pre and posttest means.

On Table 10 we can see that the fourth grade children in the Pairs group attained consistently higher percentile ratings than those in the All category, although they made almost identical pretest scores. In the fifth grade (Table 11), the same pattern holds for Class 2 while the reverse is true for Class 1. Here the Pairs group did not do as well as the All group eventhough they had superior scores on the pretest. No regular pattern was evident in Class 1 of the sixth grade (Table 12), while Class 2 showed consistently higher pre and posttest scores for the Pairs group. Many of these differences are small, but the consistency with which they occur lends support to the speculation that non-random selection and/or treatment effects were

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Table 10. Means, Standard Deviations, and t-Tests[1] for Percentile Scores. Fourth Grade

Variables	N=	Class 1 (All) Pre 32	Class 1 (All) Post 30	Class 1 (Pairs) Pre (24)	Class 1 (Pairs) Post (24)	Class 2 (All) Pre 35	Class 2 (All) Post 32	Class 2 (Pairs) Pre (29)	Class 2 (Pairs) Post (29)
Total Battery	Mean	10.4	16.9	10.3	18.3	17.1	24.1	17.3	25.6
	S.D.	11.1	12.6	11.4	12.9	20.6	21.4	20.2	21.9
Total Reading	Mean	11.7	14.4	11.6	16.3[3]	19.2	21.5	19.4	22.8[3]
	S.D.	10.1	13.6	10.5	14.3	23.0	23.2	22.7	24.1
Total Math	Mean	15.5	26.3	15.3	28.8	20.6	34.8	20.0	36.9
	S.D.	18.2	20.4	19.4	21.1	21.6	23.3	19.2	23.2
Total Language	Mean	11.1	14.9	12.0	15.9[4]	17.1	23.0	17.1	24.3[2]
	S.D.	9.8	12.0	10.8	12.2	20.0	22.2	19.7	23.1
Vocabulary	Mean	14.6	16.9	14.5	18.7[4]	21.9	22.6	21.5	24.2[5]
	S.D.	12.3	14.4	12.7	14.9	24.1	22.0	23.6	22.8
Reading Comprehension	Mean	13.4	15.7	13.4	17.6[5]	20.8	23.6	21.6	24.8[5]
	S.D.	10.3	15.3	10.8	16.2	21.5	24.5	21.5	25.6
Math Operations	Mean	23.7	30.4	23.0	32.9[3]	22.4	37.5	23.3	39.7
	S.D.	22.6	23.1	23.9	23.8	18.8	25.2	18.4	25.8
Math Concepts	Mean	12.2	20.9	13.0	23.0	23.3	32.4	21.1	34.1
	S.D.	15.3	19.5	16.6	20.2	26.9	24.5	21.5	23.9
Math Applications	Mean	14.0	27.4	13.9	30.0	23.8	35.5	21.7	37.8
	S.D.	15.2	21.4	16.3	21.9	21.6	25.2	19.2	25.0

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates that no significant differences were found.

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Table 11. Means, Standard Deviations, and t-Tests[1] for Percentile Scores. Fifth Grade

Variables	N=	Class 1 (All) Pre 34	Class 1 (All) Post 32	Class 1 (Pairs) Pre (28)	Class 1 (Pairs) Post (28)	Class 2 (All) Pre 34	Class 2 (All) Post 38	Class 2 (Pairs) Pre (32)	Class 2 (Pairs) Post (32)
Total Battery	Mean	10.0	21.6	10.6	19.3	9.7	13.7	10.0	14.9[2]
	S.D.	11.8	19.6	12.5	18.4	11.1	15.2	11.7	16.2
Total Reading	Mean	11.0	19.9	12.3	18.3[3]	9.5	10.8	10.0	11.6[5]
	S.D.	13.9	19.7	14.9	19.5	12.5	14.5	12.7	15.5
Total Math	Mean	13.2	30.8	13.1	29.1	13.8	24.6	14.1	26.3
	S.D.	10.9	23.8	11.0	23.3	15.8	21.4	15.9	20.6
Total Language	Mean	14.2	21.3	15.1	17.8[5]	13.6	13.5	14.1	14.9[5]
	S.D.	18.1	21.2	19.2	18.3	16.6	17.2	17.0	18.3
Vocabulary	Mean	12.5	20.6	14.5	19.0[5]	10.1	11.0	10.1	11.2[5]
	S.D.	13.6	20.8	14.1	20.7	10.1	14.2	10.1	14.2
Reading Comprehension	Mean	12.5	22.3	12.9	20.9[3]	12.7	13.7	13.1	14.9[5]
	S.D.	15.6	19.9	16.3	20.0	16.1	15.1	16.5	16.2
Math Operations	Mean	19.4	34.8	17.0	32.3	18.9	30.4	19.9	31.9
	S.D.	16.4	27.4	13.2	26.1	21.2	23.9	21.4	23.0
Math Concepts	Mean	15.3	33.5	16.7	33.8	20.3	27.4	20.9	30.0
	S.D.	16.5	22.4	17.5	22.3	22.5	22.2	22.9	22.9
Math Applications	Mean	14.1	29.5	14.7	27.8[3]	14.3	24.2	13.8	24.8[3]
	S.D.	11.7	25.2	11.9	24.6	13.8	22.0	13.8	21.6

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; 5 indicates no significant differences.

Table 12. Means, Standard Deviations, and t-Tests[1] for Percentile Scores. Sixth Grade

Variables	N=	Class 1 (All) Pre 30	Class 1 (All) Post 29	Class 1 (Pairs) Pre (24)	Class 1 (Pairs) Post (24)	Class 2 (All) Pre 36	Class 2 (All) Post 29	Class 2 (Pairs) Pre (24)	Class 2 (Pairs) Post (24)
Total Battery	Mean	13.4	17.2	13.1	17.3[2]	12.1	16.2	12.7	14.9[5]
	S.D.	17.4	18.2	18.1	18.7	10.9	15.3	11.9	15.4
Total Reading	Mean	11.3	15.3	10.8	15.5[2]	14.4	17.2	14.8	16.8[5]
	S.D.	17.3	16.9	17.7	17.6	15.3	19.5	16.4	19.7
Total Math	Mean	20.5	28.6	19.4	27.1	13.7	24.2	14.7	21.8[2]
	S.D.	20.6	22.3	20.9	21.6	13.5	20.9	12.6	21.3
Total Language	Mean	11.2	15.1	11.3	16.0[3]	11.9	15.6	12.1	14.5[4]
	S.D.	15.1	17.6	16.1	18.7	10.1	14.8	11.6	14.8
Vocabulary	Mean	11.1	15.4	10.9	15.6[3]	17.1	16.6	16.9	17.0[5]
	S.D.	15.0	14.4	15.4	15.3	15.9	19.2	17.0	20.6
Reading Comprehension	Mean	14.0	17.6	13.5	17.3[4]	15.3	19.9	15.9	18.6[5]
	S.D.	19.7	19.9	20.2	20.8	14.1	21.5	15.2	19.4
Math Operations	Mean	27.0	35.2	25.5	32.5[2]	21.2	29.3	22.3	27.5[4]
	S.D.	21.5	23.8	21.7	23.0	19.3	23.4	17.8	23.4
Math Concepts	Mean	19.8	24.7	19.2	21.5[5]	12.6	22.2	14.3	19.7[5]
	S.D.	21.7	24.3	22.6	22.2	12.0	20.4	12.9	21.6
Math Applications	Mean	18.3	27.2	16.7	27.4[2]	13.4	24.3	13.3	21.2[4]
	S.D.	20.7	23.8	19.8	23.2	12.5	23.9	11.2	23.4

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; 5 indicates no significant differences.

occurring. There were few class-based differences in statistically significant changes from pre to posttest in the fourth and fifth grade classes. At the sixth grade level, however, Class 2 obtained a reliable change in percentile rating in only one of the nine analyses. This contrasted with only one non-reliable change, on math concepts, for Class 1.

Tables 13 and 14 compare the percentile scores for the bilingual and control classes. In these tables we have combined the ratings for the two bilingual classes for each grade. Although the scores for the bilingual children are consistently lower than those for the controls, the fourth graders made significant percentile gains on all nine data sets, the fifth graders on all except language and vocabulary, and the sixth graders on all except math concepts. Table 14 also shows that, in general, all children made significant pre-post gains on all subtests, as well as the total battery.

The graphic presentation of these statistics, shown in Figure 2, reveals some interesting contrasts both within and across treatments and grades. The first and most dramatic feature which catches the eye is the length of the pre-post bars for the control groups, on every subtest and grade level except that of the fifth grade percentile ratings for language. The second, and most disturbing feature, is that the fifth grade experimental classes are consistently below the fourth grade. And on two of the four subtests, math and language, the sixth grade is below the fifth. A similar decrement is demonstrated by the control class for the fifth grade, but the sixth grade maintains its percentile gains. We should remember that what we are concerned with here are not absolute scores or grade equivalencies. Rather, we are looking at relative positions in comparison with national norming samples, which apply across grade levels.

Table 13. Means, Standard Deviations, and t-Tests for Percentile Scores Fourth and Fifth Grades; Experimental (E) and Control (C) Groups

Variables	N=	Experimental Fourth Pre (54)	Experimental Fourth Post (54)	Control Fourth Pre (25)	Control Fourth Post (25)	Experimental Fifth Pre (60)	Experimental Fifth Post (60)	Control Fifth Pre (12)	Control Fifth Post (12)
Total Battery	Mean	14.0	22.2	21.7	37.9	10.3	17.0	14.9	43.6[3]
	S.D.	16.8	18.4	14.6	23.2	12.0	17.2	16.3	39.9
Total Reading	Mean	15.8	19.8	22.3	31.4[2]	11.1	14.7[3]	23.7	42.1[5]
	S.D.	18.4	20.3	16.1	21.2	13.7	17.7	26.0	34.7
Total Math	Mean	17.8	33.2	26.3	53.1	13.7	27.6	8.5	42.9
	S.D.	19.3	22.4	18.6	27.0	13.7	21.7	10.7	32.1
Total Language	Mean	14.7	20.4	20.6	33.7	14.6	16.3[5]	27.4	27.3[5]
	S.D.	16.3	19.2	15.4	21.8	17.9	18.2	9.7	36.9
Vocabulary	Mean	18.3	21.6[3]	25.5	30.8[4]	12.4	14.8[5]	13.3	33.4[5]
	S.D.	19.5	19.6	18.2	22.2	12.2	18.2	7.0	36.0
Reading Comprehension	Mean	17.8	21.5[3]	22.5	35.9	13.0	17.7[3]	14.9	35.1[5]
	S.D.	17.7	21.9	17.7	24.3	16.3	18.1	12.1	39.9
Math Operations	Mean	23.1	36.6	31.8	52.5	18.6	32.1	9.4	35.3[3]
	S.D.	20.9	24.9	23.7	26.9	18.0	24.3	8.7	33.7
Math Concepts	Mean	17.3	28.9	26.8	53.8	19.0	31.8	15.4	52.3[3]
	S.D.	19.6	22.8	19.9	24.9	20.5	22.6	20.8	37.7
Math Applications	Mean	18.1	34.2	22.5	51.3	14.3	26.2	4.3	27.0[4]
	S.D.	18.2	23.7	19.4	28.4	12.8	22.9	3.9	29.1

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant difference.

Table 14. Means, Standard Deviations, and t-Tests[1] for Percentile Scores Experimental and Control Groups

Variables	N=	Sixth Experimental Pre (48)	Sixth Experimental Post (48)	Sixth Control Pre (16)	Sixth Control Post (16)	TOTAL Experimental Pre (162)	TOTAL Experimental Post (162)	TOTAL Control Pre (63)	TOTAL Control Post (63)
Total Battery	Mean	12.9	16.1[2]	24.2	52.1	12.3	18.5	20.7	40.9
	S.D.	15.2	17.0	21.5	33.8	14.7	17.7	17.1	31.0
Total Reading	Mean	12.8	16.1[2]	23.6	52.7	13.1	16.8	20.2	39.1
	S.D.	17.0	18.5	24.6	29.3	16.4	18.8	19.2	29.7
Total Math	Mean	17.1	24.5	27.9	53.6	16.1	28.6	24.5	50.1
	S.D.	17.4	21.4	24.0	31.5	16.8	22.0	20.3	30.9
Total Language	Mean	11.7	15.3[2]	22.1	51.3	13.8	17.3	22.0	39.5
	S.D.	13.9	16.7	20.3	35.3	16.2	18.1	16.9	31.3
Vocabulary	Mean	13.8	16.3[4]	25.0	49.5	14.7	17.5[2]	22.8	38.2
	S.D.	16.3	17.9	22.8	28.1	16.2	18.7	19.1	28.9
Reading Comprehension	Mean	14.7	18.0[3]	25.1	55.2	15.1	19.0	21.4	41.6
	S.D.	17.7	19.9	25.4	31.3	17.2	19.9	20.1	31.5
Math Operations	Mean	23.9	30.1	29.0	56.8	21.7	33.0	27.6	50.4
	S.D.	19.8	23.1	22.1	28.6	19.5	24.1	22.6	29.6
Math Concepts	Mean	16.8	20.6[5]	34.3	52.0[2]	17.8	27.5	27.6	52.3
	S.D.	18.5	21.7	27.2	33.4	19.6	22.7	22.0	29.9
Math Applications	Mean	15.0	24.4[2]	31.7	49.7[2]	15.8	28.3	23.2	46.8
	S.D.	16.1	23.3	27.7	30.3	15.7	23.5	21.6	30.3

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 = no significant differences obtained.

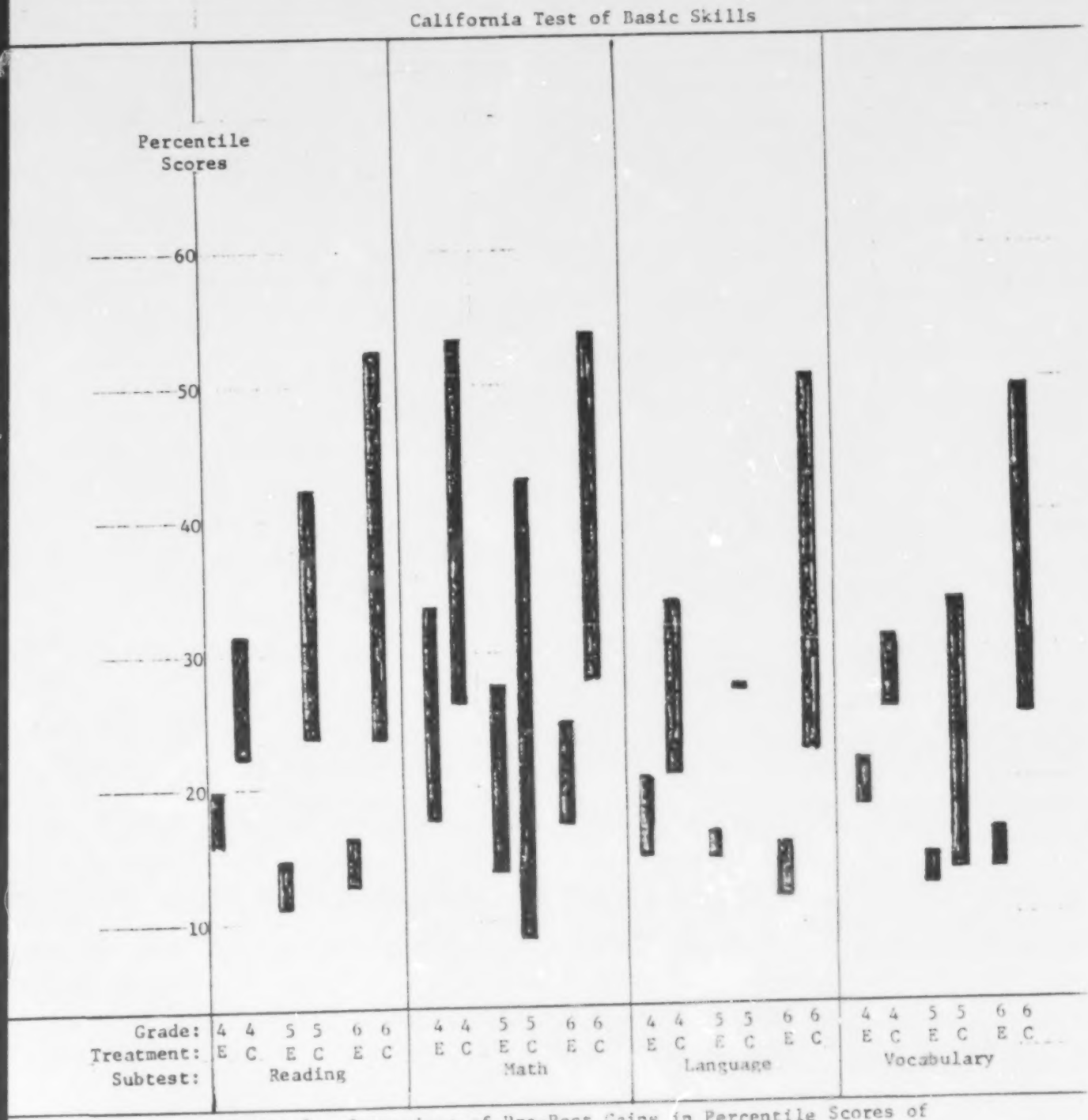

Figure 2. Comparison of Pre-Post Gains in Percentile Scores of Experimental (E) and Control (C) Groups, by Grade.

For some reason, the testing service did not supply grade equivalent scores for the fourth grade. Hence we are able to look at grade equivalencies only for the fifth and sixth grades. Table 15 presents pre-post data for experimental and control classes separately. Again we see that the control children perform at a considerably higher level than do the ones in the bilingual classes. The former group, as a whole, are at or above grade. However, there is an extremely wide range, as indicated by the unusually large standard deviations. For example, in the fifth grade there are a number of children who score below 1.6, and perhaps a similar group who score above 9.6 grade level on the language subtest. The children in the bilingual classes do not attain as high a grade level score, but very few fall below the 1.6 point.

Percentiles and grade equivalent scores are designed to make possible contrasts across grade levels. In Table 16 we compare the experimental (bilingual) and control groups on pre and posttest scores for both types of statistics. In addition, this table provides t-tests assessing the level of probability that the obtained differences are greater than chance. The analyses indicate that there are indeed large differences (beyond the one-chance-in-a-thousand level) for all posttest comparisons. On the pretest there are also significant differences for all but the math operations subtest. This is true whether we use the percentile or grade equivalent, even though the latter does not include any of the fourth grade population. These findings indicate that not only did the control group start the year with a considerable advantage over the bilingual children, but it ended with an even more substantial one.

When we compare two groups which begin at different points, it is often desirable to use a statistical procedure to "adjust" the posttest score so as to account for the initial handicap. Thus, using the pretest

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Table 15. Means, Standard Deviations, and t-Tests for Grade Equivalent Scores Fifth and Sixth Grades, Experimental (E) and Control (C) Groups

		Fifth				Sixth			
		Experimental		Control		Experimental		Control	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Variables	N=	(60)		(11)		(48)		(19)	
Total Battery	Mean	2.7	3.5[1]	3.3	5.7[3]	3.3	3.9	4.3	7.2
	S.D.	1.0	1.3	0.9	3.3	1.3	1.5	1.6	3.1
Total Reading	Mean	2.5	3.1	2.9	5.7[3]	3.2	3.6	4.1	7.1
	S.D.	1.1	1.4	1.2	3.6	1.5	1.8	2.0	2.8
Total Math	Mean	3.0	4.5	3.1	5.5[3]	3.9	4.7	4.8	7.3[2]
	S.D.	1.0	1.5	1.4	3.4	1.4	1.7	1.6	2.9
Total Language	Mean	2.7	3.2[2]	3.7	5.6[5]	2.9	3.4	3.9	7.1
	S.D.	1.3	1.6	1.0	4.0	1.3	1.6	1.7	3.6
Vocabulary	Mean	2.6	3.1	3.4	5.4[5]	3.1	3.7	4.2	6.7[5]
	S.D.	1.1	1.5	1.1	3.5	1.5	1.8	1.8	2.4
Reading Comprehension	Mean	2.5	3.3	2.8	6.3[3]	3.2	3.7[2]	4.2	7.4[2]
	S.D.	1.2	1.5	1.2	4.2	1.6	2.0	2.4	3.3
Math Operations	Mean	3.5	4.8	3.5	6.0[3]	4.5	5.3	4.9	7.6[3]
	S.D.	1.1	1.6	1.3	2.8	1.4	1.8	1.4	2.7
Math Concepts	Mean	3.0	4.3	3.4	6.5[3]	3.3	4.0[2]	4.7	6.9
	S.D.	1.6	1.8	1.9	3.1	1.6	2.0	2.4	3.2
Math Applications	Mean	2.8	4.0	2.5	5.4[5]	3.4	4.5	4.9	6.9
	S.D.	1.0	1.9	1.0	3.4	1.4	2.2	2.5	2.9

[1] All paired pre-post scores show gains significant at the .001 level unless otherwise noted. A 2 represents the .01 level; 3 = .05; 4 = .10; and 5 indicates no significant difference.

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Table 16. Comparison of Percentile and Grade Equivalent Pretest and Posttest Scores Experimental and Control Groups

Variables		Percentile				Grade Equivalent			
		Pretest		Posttest		Pretest		Posttest	
		E 202	C 63	E 191	C 60	E 134	C 35	E 191	C 60
Total Battery	Mean	12.2	20.7	18.3	40.9	3.0	3.8	3.6	5.3
	S.D.	14.4	17.1	17.5	31.0	2.8	1.4	1.3	2.7
Total Reading	Mean	13.0	20.2[2]	16.5	39.1	2.8	3.6[2]	3.2	5.1
	S.D.	16.1	19.2	18.3	29.7	1.3	1.8	1.5	2.8
Total Math	Mean	16.2	24.5[2]	28.4	50.1	3.5	4.1[3]	4.3	5.7
	S.D.	17.1	20.3	22.2	30.9	1.2	1.6	1.5	2.6
Total Language	Mean	13.2	22.0	17.3	39.5	2.8	3.7	3.2	5.1
	S.D.	15.4	16.9	18.1	31.3	1.2	1.4	1.5	3.1
Vocabulary	Mean	14.8	22.8	17.1	38.2	2.9	3.7[2]	3.3	4.9
	S.D.	16.2	19.1	17.9	28.9	1.3	1.6	1.5	2.6
Reading Comprehension	Mean	15.0	21.4[2]	18.9	41.6	2.9	3.7	3.3	5.4
	S.D.	16.7	20.1	19.9	31.5	1.4	2.1	1.7	3.2
Math Operations	Mean	22.0	27.6[4]	32.1	50.4	4.0	4.3[5]	4.7	5.8
	S.D.	19.9	22.6	24.4	29.6	1.4	1.5	1.8	2.4
Math Concepts	Mean	17.4	27.6	27.3	52.3	3.0	4.0[2]	4.0	5.9
	S.D.	20.1	22.0	22.7	30.0	1.6	2.1	1.8	2.6
Math Applications	Mean	16.4	23.2[2]	28.2	46.8	3.1	3.9[2]	4.1	5.6
	S.D.	16.6	21.6	23.7	30.3	1.2	2.2	1.9	2.7

[1] All paired E/C scores show significantly higher scores for the Control group, unless otherwise indicated. A 2 represents a significantly higher Control score at the .01 level; 3 = .05; 4 = .10; and 5 = no significant differences were obtained.

as a covariate, we compute appropriately adjusted posttest scores which can then be tested for significant differences. A series of covariance analyses are reported in Tables 17 through 27. The first nine of these (17 through 25) are analyses of the percentile scores for the total battery and the different subests for each grade separately, while Table 26 looks at the same sets of scores but for all grades combined. Table 27 deals with the grade equivalent scores for the fifth and sixth grades.

In all these analyses we are not only looking for differences between bilingual and control classes but we also want to determine whether, within each of these categories, there are any significant effects attributable to length of exposure to the program. To do this most expeditiously we have divided both the bilingual and control groups into those with three years or more (E1) and those with two years or less (E2) periods of continuity. The same criteria were used for the control groups (C1 and C2) to establish a degree of stability in the control classrooms.

Across all analyses, there are significant differences among the pretest scores for these four populations. This supports the need for a covariance analysis, although we do recognize that research in data analysis has exposed the inadequacy of statistical manipulations with unmatched samples. All of our subsequent discussion is based on the adjusted posttest scores. The deviation figures in the tables also refer to adjusted posttest score deviations from the grand means presented in each table.

With few exceptions, the children in the fourth and fifth grades who have been longest in the bilingual program have the lowest scores. There is an important difference in that in the fourth grade there are extremely small differences between the bilingual and experimental groups. Five of the nine analyses show no significant differences; in the four where the differences can be said to be greater than chance they derive

Table 17. Covariate[1] Analysis on Percentile Scores for Total Battery (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	25962.2	300.70***	1	19124.0	63.00***	1	30590.1	155.76***
Treatment	3	292.1	3.83*	3	1171.8	3.86*	3	2353.2	11.82***
Residual	71	86.3		66	303.6		60	196.4	
Total	75	439.6		70	609.6		64	772.4	
Grand Mean	26.6			21.2			26.1		
Deviation	E1 = -3.6 C1 = -0.7			E1 = -3.2 C1 = +18.1			E1 = -5.4 C1 = +19.6		
	E2 = -0.1 C2 = +5.8			E2 = -2.9 C2 = +15.9			E2 = -9.2 C2 = +16.5		

Table 18. Covariate Analysis on Percentile Scores for Total Reading (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	25364.8	219.55***	1	14195.6	42.44***	1	28747.4	153.58***
Treatment	3	225.7	1.95	3	2201.1	6.58**	3	3148.6	16.82***
Residual	73	115.5		66	334.5		62	187.2	
Total	77	447.7		70	612.5		66	754.5	
Grand Mean	23.4			19.4			26.5		
Deviation	E1 = -2.6 C1 = -2.3			E1 = -4.8 C1 = +19.3			E1 = -7.1 C1 = +14.6		
	E2 = -0.8 C2 = +4.9			E2 = -3.4 C2 = +24.3			E2 = -8.8 C2 = +21.0		

[1]Pretest core used as covariate. Deviation adjusted for pretest score.
E1 = Students in program 3 years or more; E2 = Students in program 2 years or less. C1 = Students in control group 3 years or more; C2 = students in control group 2 years or less.

*P < .05; ***P < .01; ***P < .001

Table 19. Covariate Analysis on Percentile Scores for Total Math (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	33314.3	177.40***	1	25217.0	75.99***	1	28495.4	108.42***
Treatment	3	757.3	4.03**	3	741.8	2.23	3	1556.9	5.92**
Residual	72	187.8		66	332.1		60	262.8	
Total	76	646.1		70	705.1		64	764.6	
Grand Mean	39.1			30.8			32.6		
Deviation	E1 = -6.1 C1 = +2.0			E1 = -3.8 C1 = +14.2			E1 = -4.2 C1 = +19.8		
	E2 = -0.2 C2 = +9.0			E2 = -0.8 C2 = +12.0			E2 = -7.2 C2 = +11.1		

Table 20. Covariate Analysis on Percentile Scores for Total Language (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	21306.8	138.05***	1	12127.0	28.71***	1	30224.0	137.04***
Treatment	3	367.5	2.38	3	760.9	1.80	3	2544.5	11.54***
Residual	73	154.3		66	422.3		61	220.6	
Total	77	437.4		70	604.1		65	789.4	
Grand Mean	24.8			20.1			25.1		
Deviation	E1 = -4.6 C1 = +1.4			E1 = -4.7 C1 = +16.8			E1 = - 4.5 C1 = +19.5		
	E2 = -0.3 C2 = +5.5			E2 = -0.0 C2 = +11.2			E2 = -11.1 C2 = +17.1		

[1]Pretest score used as covariate. Deviation adjusted for pretest score. E1 = Students in program 3 years or more; E2 = Students in program 2 years or less. C1 = Students in control group 3 years or more; C2 = students in control group 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 21. Covariate Analysis on Percentile Scores for Vocabulary (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	21160.0	130.60***	1	15535.9	44.54***	1	24677.6	119.96***
Treatment	3	116.3	0.72	3	1544.0	4.43**		2340.9	11.38***
Residual	73	162.0		66	348.8		63	205.7	
Total	77	432.9		70	617.0		67	666.6	
Grand Mean	24.7			19.4			25.6		
Deviation	E1 = -1.4 C1 = -2.3			E1 = -4.8 C1 = + 9.9			E1 = -6.8 C1 = +16.7		
	E2 = -0.9 C2 = +3.6			E2 = -1.7 C2 = +22.7			E2 = -6.1 C2 = +17.0		

Table 22. Covariate Analysis on Percentile Scores for Reading Comprehension

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	25466.9	118.32***	1	13052.3	33.93***	1	27964.9	111.62***
Treatment	3	507.4	2.36	3	2072.4	5.39**	3	3852.7	15.38***
Residual	73	215.2		66	384.6		62	250.5	
Total	77	554.6		70	637.9		66	834.2	
Grand Mean	26.3			22.1			28.5		
Deviation	E1 = -4.1 C1 = +0.3			E1 = -3.4 C1 = +29.9			E1 = - 6.7 C1 = + 7.9		
	E2 = -1.7 C2 = +7.3			E2 = -4.7 C2 = +20.6			E2 = -10.7 C2 = +24.7		

[1]Pretest score used as covariate. Deviation adjusted for pretest score. E1 = Students in program 3 years or more; E2 = 2 years or less. C1 = Students in control group 3 years or more; C2 = 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 23. Covariate Analysis on Percentile Scores for Math/Operations (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	26331.1	75.59***	1	21262.1	48.84***	1	23670.9	80.43***
Treatment	3	799.6	2.30	3	906.4	2.08	3	2220.2	7.54***
Residual	74	348.4		66	435.3		61	294.3	
Total	78	698.8		70	753.1		65	742.8	
Grand Mean	41.6			34.5			37.4		
Deviation	E1 = -7.8 C1 = +4.3			E1 = -4.3 C1 = +18.9			E1 = -6.0 C1 = +22.2		
	E2 = +2.6 C2 = +5.5			E2 = -0.4 C2 = +10.1			E2 = -6.1 C2 = +13.9		

Table 24. Covariate Analysis on Percentile Scores for Math/Concepts (CTBS)

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	30424.6	132.19***	1	17706.0	40.95***	1	27199.9	74.64***
Treatment	3	1829.1	7.95***	3	1597.1	3.69*	3	1499.9	4.12**
Residual	74	230.2		66	432.4		61	364.4	
Total	78	678.8		70	729.1		65	829.7	
Grand Mean	36.8			35.8			29.2		
Deviation	E1 = -6.4 C1 = -1.4			E1 = -6.0 C1 = +16.6			E1 = - 1.8 C1 = + 9.8		
	E2 = -3.7 C2 = +14.8			E2 = -0.6 C2 = +19.5			E2 = -10.9 C2 = +14.1		

[1]Pretest score used as covariate. Deviation adjusted for pretest score. E1 = Students in program 3 years or more; E2 = 2 years or less. C1 = students in control group 3 years or more; C2 = 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 25. Covariate Analysis on Percentile Scores for Math/Applications

	Fourth Grade			Fifth Grade			Sixth Grade		
	df	Mean Score	F	df	Mean Score	F	df	Mean Score	F
Pretest	1	18392.3	47.17***	1	181.9	0.28	1	22263.4	54.61***
Treatment	3	1618.5	4.02**	3	1154.5	1.74	3	725.5	1.78
Residual	73	402.6		66	662.1		60	407.7	
Total	77	691.4		70	676.3		64	764.1	
Grand Mean	39.5			28.4			31.4		
Deviation	E1 = -7.5	C1 = - 3.9		E1 = -6.8	C1 = +16.0		E1 = -2.4	C1 = +16.5	
	E2 = -1.1	C2 = +13.6		E2 = +2.4	C2 = +11.1		E2 = -5.3	C2 = + 5.8	

[1]Pretest scores used as covariate. Deviation adjusted for pretest score. E1 = Students in program 3 years or more; E2 = 2 years or less. C1 = Students in control group 3 years or more; C2 = 2 years or less.

*P < .05; **P < .01; ***P < .001

from the fact that the C2 group is considerably superior to E1, E2, and C1. Only in the math concepts and math applications subtests does this latest group of entrants into the control classrooms achieve the decisive superiority demonstrated by the control groups generally in the fifth and sixth grades.

For the fifth grade, there is a consistent and clear-cut difference between the bilingual and control group on all the analyses. These are statistically significant in only four of the nine computations, but the regularity of the pattern and the size of the positive adjusted deviations achieved by the control students lends stability to this finding. The same superiority of the control groups are indicated at the sixth grade level. Here the differences between experimental and control classes are even greater, achieving a .001 level of probability (one chance in a thousand) that they are greater than random variability. Only in the math applications subtest does the control group fail to attain a statistically superior score. There is, however, an interesting difference between the fifth and sixth graders for the bilingual groups. The children who have been longest in the program (E1) are consistently superior (except on the vocabulary subtest) to those who entered the program more recently.

When we look at the percentile scores across grade levels (Table 26) we find significant differences, at the .001 level, on all nine analyses. On total battery, total reading, total math, and total language percentile scores the major differences are between the bilingual and control groups as a whole, with only small, random differences within the two categories. With the individual subtests, the C2 group (children in the control classes who have been present only in the last two years) is consistently higher than all other groups, except in math operations.

Table 26. Covariate Analyses on Percentile Scores for Total CTBS Battery and Subtests

All Grades Combined

	Total Battery			Total Reading			Total Math		
	df	Mean Score	F	df	Mean Score	F	df	Mean Score	F
Pretest	1	76676.6	385.01***	1	69137.6	302.40***	1	87791.0	333.94***
Treatment	3	2810.7	14.11***	3	3846.7	16.83***	3	2592.7	9.86***
Residual	207	199.2		211	228.6		208	262.9	
Total	211	598.7		215	599.6		212	708.7	
Grand Mean	24.7			23.1			34.4		
Deviation	E1 = -4.2 C1 = +12.0			E1 = -4.7 C1 = +10.0			E1 = -5.1 C1 = +11.8		
	E2 = -3.0 C2 = +11.3			E2 = -3.9 C2 = +13.6			E2 = -1.1 C2 = +10.0		

	Total Language			Vocabulary			Reading Comprehension		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	59240.1	206.77***	1	61537.6	245.76***	1	67024.0	226.68***
Treatment	3	3003.4	10.48***	3	2709.4	10.82***	3	4824.4	16.32***
Residual	210	286.5		212	250.4		211	295.7	
Total	214	600.1		216	568.3		215	669.2	
Grand Mean	23.3			23.2			25.6		
Deviation	E1 = -3.8 C1 = +11.9			E1 = -4.5 C1 = + 8.5			E1 = -4.4 C1 = + 9.8		
	E2 = -4.0 C2 = +11.4			E2 = -2.6 C2 = +11.4			E2 = -5.3 C2 = +15.4		

	Math/Operations			Math/Concepts			Math/Applications		
	df	Mean Square	F	df	Mean Square	F	df	Mean Square	F
Pretest	1	72374.4	202.15***	1	73325.2	208.03***	1	38305.1	75.54***
Treatment	3	3166.0	8.84***	3	4196.8	11.91***	3	3356.8	6.62***
Residual	211	358.0		211	352.5		209	507.1	
Total	215	732.2		215	745.5		213	724.7	
Grand Mean	38.0			34.2			33.4		
Deviation	E1 = -6.3 C1 = +14.7			E1 = -4.9 C1 = + 7.3			E1 = -6.0 C1 = + 7.8		
	E2 = -0.0 C2 = + 9.0			E2 = -3.6 C2 = +15.5			E2 = -1.0 C2 = +12.8		

Table 27 treats only with the grade equivalent scores for the fifth and sixth grades, subdivided into the same two experimental and control groups. The relationships are almost precisely the same as those found with the percentile scores. Of particular interest on this table is the finding that the posttest adjusted means for the bilingual children are approximately two years below grade level on the language-based tests, but less than a year below on most of the math tests.

In the preceding tables and discussions we have presented the data with little attempt at interpretation. The next three tables are provided to lend support to some of our speculations as to what was happening over the six years of the bilingual funding. Table 28 reports the chronological age and average daily attendance for the two bilingual groups - those in the program three years or more and those in for two years or less. We see that the children who have been longest in the program are consistently older than those who entered more recently. They are also much more regular in their attendance, hence their generally poorer achievement level cannot be attributed to lack of exposure or school motivation. The indications are that these are the slower learners who couldn't make it into the regular classroom. Ironically, the "regular" classroom is the one we have had to use as our control or contrast group. As we have reviewed the roster of children in that class we found many of the children who had originally been in the bilingual program. They were among the highest scorers in the "control" group. Over the years there has been a non-random skimming off of the most capable students in the bilingual classes.

What then was the composition of these classes? If we turn to Table 30 we can see what has occurred. In the first year (1969-1970), 19 Spanish-surname children in kindergarten and 18 in first grade entered the bilingual classes. By the end of the sixth year there were only two

Table 27. Covariate Analyses on Grade Equivalent Scores for Total CTBS Battery and Subtest Scores. Fifth and Sixth Grades Only.

Table 27a. Total Battery

	Fifth Grade df	Mean Square	F	Sixth Grade df	Mean Square	F
Pretest	1	112.1	61.16***	1	250.2	150.85***
Treatment	3	5.8	3.17*	3	19.6	11.81***
Residual	66	1.8		60	1.7	
Total	70	3.6		64	6.4	
Grand Mean =	3.9			Grand Mean =	4.8	
[1]Deviation:	E1 = -0.3 C1 = +1.1			[1]Deviation:	E1 = -0.4 C1 = +1.9	
	E2 = -0.2 C2 = +1.2				E2 = -0.9 C2 = +1.4	

Table 27b. Total Reading

	Fifth Grade df	Mean Square	F	Sixth Grade df	Mean Square	F
Pretest	1	85.9	32.1***	1	271.3	149.71***
Treatment	3	15.0	5.6**	3	27.2	15.03***
Residual	66	2.7		62	1.8	
Total	70	4.4		66	7.1	
Grand Mean =	3.5			Grand Mean =	4.6	
[1]Deviation:	E1 = -0.3 C1 = +1.5			[1]Deviation:	E1 = -0.7 C1 = +1.5	
	E2 = -0.4 C2 = +2.1				E2 = -0.8 C2 = +1.9	

Table 27c. Total Math

	Fifth Grade df	Mean Square	F	Sixth Grade df	Mean Square	F
Pretest	1	104.0	48.38***	1	215.1	118.03***
Treatment	3	2.9	1.35	3	12.6	6.89***
Residual	66	2.2		60	1.8	
Total	70	3.6		64	5.7	
Grand Mean =	4.6			Grand Mean =	5.5	
[1]Deviation:	E1 = -0.3	C1 = +0.7		[1]Deviation:	E1 = -0.3	C1 = +1.9
	E2 = 0.0	C2 = +0.8			E2 = -0.7	C2 = +0.9

[1]Deviation from Grand Mean is adjusted for pretest score. E1 = Students in program 3 years or more; E2 = Students in program 2 years or less. C1 = Students in control group 3 years or more; C2 = Students in control group 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 27 (Cont.) Covariate Analyses on Grade Equivalent Scores for Total CTBS Battery and Subtest Scores. Fifth and Sixth Grades Only.

Table 27d. Total Language

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	90.5	24.69***	1	291.4	117.83***
Treatment	3	8.6	2.35	3	28.1	11.37***
Residual	66	3.7		61	2.5	
Total	70	5.1		65	8.1	
Grand Mean = 3.6				Grand Mean = 4.4		
[1]Deviation: E1 =-0.5 C1 = +1.5 E2 = 0.0 C2 = +1.4				[1]Deviation: E1 =-0.4 C1 = +2.2 E2 =-1.2 C2 = +1.7		

Table 27e. Vocabulary

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	101.2	39.15***	1	204.9	108.16***
Treatment	3	22.9	2.95*	3	19.2	10.15***
Residual	66	170.6		64	1.9	
Total	70	294.6		68	5.6	
Grand Mean = 3.5				Grand Mean = 4.5		
[1]Deviation: E1 =-0.3 C1 = +0.8 E2 =-0.1 C2 = +1.6				[1]Deviation: E1 =-0.6 C1 = +1.7 E2 =-0.7 C2 = +1.5		

Table 27f. Reading Comprehension

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	89.6	25.25***	1	277.0	100.84***
Treatment	3	24.7	6.95***	3	38.6	14.05***
Residual	66	3.5		62	2.7	
Total	70	5.7		66	8.5	
Grand Mean = 3.8				Grand Mean = 4.7		
[1]Deviation: E1 = -0.4 C1 = +2.5 E2 = -0.5 C2 = +2.3				[1]Deviation: E1 =-0.7 C1 = +0.8 E2 =-1.1 C2 = +2.5		

[1]Deviation from Grand Mean is adjusted for pretest score. E1 = Students in program 3 years or more; E2 = Students in program 2 years or less. C1 = Students in control group 3 years or more; C2 = Students in control group 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 27 (Cont.) Covariate Analyses on Grade Equivalent Scores for Total CTBS Battery and Subtest Scores. Fifth and Sixth Grades Only.

Table 27g. Math/Operations

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	87.3	43.16***	1	167.9	76.23***
Treatment	3	5.6	2.78*	3	16.6	7.55***
Residual	66	2.0		61	2.2	
Total	70	3.4		65	5.4	
Grand Mean =	5.0			Grand Mean =	5.9	
[1]Deviation:	E1 =-0.3 C1 = +1.6			[1]Deviation:	E1 =-0.5 C1 = +1.9	
	E2 =-0.1 C2 = +0.7				E2 =-0.6 C2 = +1.2	

Table 27h. Math/Concepts

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	96.4	33.5***	1	226.2	69.96***
Treatment	3	11.9	4.1**	3	15.2	4.72**
Residual	66	2.9		61	3.2	
Total	70	4.6		65	7.2	
Grand Mean =	4.7			Grand Mean =	4.8	
[1]Deviation:	E1 =-0.5 C1 = +1.3			[1]Deviation:	E1 =-0.2 C1 = +1.1	
	E2 = 0.0 C2 = +1.7				E2 =-1.1 C2 = +1.4	

Table 27i. Math/Applications

	Fifth Grade			Sixth Grade		
	df	Mean Square	F	df	Mean Square	F
Pretest	1	2.1	0.44	1	209.9	61.26***
Treatment	3	9.1	1.90	3	6.9	2.02
Residual	66	4.8		60	3.4	
Total	70	4.9		64	6.8	
Grand Mean =	4.3			Grand Mean =	5.2	
[1]Deviation:	E1 = -0.6 C1 = +1.6			[1]Deviation:	E1 =-0.2 C1 = +1.6	
	E2 = +0.2 C2 = +0.9				E2 =-0.6 C2 = +0.5	

[1]Deviation from Grand Mean is adjusted for pretest score. E1 = Students in program 3 years or more; E2 = Students in program 2 years or less. C1 = Students in control group 3 years or more; C2 = Students in control group 2 years or less.

*P < .05; **P < .01; ***P < .001

Table 28. Means and Standard Deviations for Chronological Age in Months and Average Daily Attendance, by Grade and Years in Program (E1 = 3 years or more; E2 = 2 years or less)

		Chronological Age			Average Daily Attendance			
		N	Mean	S.D.	N	Mean	S.D.	%
4th Grade	E1	32	125.4	11.9	30	143.5**	30.4	86.4
	E2	40	124.9	9.2	39	120.2	44.1	72.4
	Total	72	125.1	11.4	69	120.2	44.1	72.4
5th Grade	E1	36	136.5	8.5	33	147.5***	18.7	88.9
	E2	37	135.4	7.5	37	114.9	44.6	69.2
	Total	73	135.9	8.6	70	129.4	35.3	78.0
6th Grade	E1	44	148.6	9.1	44	141.4**	30.9	85.2
	E2	25	148.2	8.6	23	115.9	40.2	69.8
	Total	69	148.5	9.2	67	132.6	37.1	79.9
Total	E1	112	138.1*	13.7	107	143.9***	27.4	86.7
	E2	102	134.4	12.4	99	117.2	43.0	70.6

Table 29. Attendance Patterns, by Grade

# of Days Attended	Percent	Fourth Grade N	Fourth Grade %	Fifth Grade N	Fifth Grade %	Sixth Grade N	Sixth Grade %	Total N	Total %
≤ 50	≤ 30	6	8.9	4	5.6	3	4.4	13	6.3
51-115	31- 70	10	14.5	13	18.6	13	19.4	36	17.5
116-150	71- 90	25	36.2	23	32.9	18	26.9	66	32.0
151-166	91-100	28	40.6	30	42.9	33	49.3	91	44.2

*P < .05; **P < .01; ***P < .001 Indicates Mean of E1 significantly greater than Mean of E2.

Table 30. Continuity in Program, by Grade

Program Year	Grade K	1	2	3	4	Grade K	1	2	3	4	5	Grade 1	2	3	4	5	6
1969-70*						(19)	13	8	7	3	2	(18)	14	9	7	5	4
1970-71*	(27)	19	17	14	11		(11)	10	7	7	4		(12)	10	10	8	7
1971-72 (Black)		13	10	3	1			13	6	3	3			12	8	5	2
(Chicano)		(24)	13	7	7			(29)	24	17	12			(28)	15	10	9
1972-73 (Black)			5	1	0				11	3	3				5	2	0
(Chicano)			(35)	15	14				(29)	13	10				(32)	17	13
1973-74 (Black)				8	5					1	1					3	3
(Chicano)				(16)	7					(17)	4					(20)	10
1974-75 (Black)					3						4						6
(Chicano)					(28)						(34)						(17)
# Black	0	13	15	12	9	0	0	13	17	7	11	0	0	12	13	10	11
# Chicano	27	43	65	52	67	19	24	47	67	57	66	18	26	47	64	60	60
Total	27	56	80	64	76	19	24	60	84	64	77	18	26	59	77	70	71
% Black	0	23	19	19	12	0	0	22	20	11	14	0	0	20	17	14	15
% New**		56	54	31	42		46	62	43	30	52		46	60	50	33	28

*Only Chicano students with limited or no facility in English were in the first two years of the program, with one class per grade level. From the third year on, there were two classes per grade. In all six years, there were a total of nine non-Black/non-Chicano students in the bilingual classes. They have not been included in this table.

**% of Chicano children who were new entrants to the program at that grade level. Many of these children had little or no facility in English, and several were newly-arrived Mexican children who had never attended school before.

(N) Number of Chicano children entering bilingual classes at grade during successive program years.

of the kindergarten and four of the first grade children left in the fifth and sixth grade, respectively. Of the 27 kindergarten children who started in the second year, 11 were still in the program for our final evaluation. In the third year of the program, when the bilingual classes were each split into two per grade level, more new children were added than remained from the first two years. Thus, 56% of the Chicano children in the first grade, 62% in second, and 60% in third were new to the program. Most of these newcomers had little English-language facility, and many of them had never attended school before.

If we look at the last column for each of the entering classes we see the total population structure of the last year. The 1970-1971 entering kindergarten class had 11 children from the first year, 7 from the second, 14 from the third, 7 from the fourth, and 28 new children in their fifth program year. In addition, there were 9 Black children. This class had taken in 13 Black children in 1971-72; only one was left in 1975. None of the five added in second grade, five of the eight in third, and three new students made up the total Black population in the fourth grade classes. There were a total of 41% new children in this last year.

The fifth grade class showed a similar pattern. There were 2 from the first year, 4 from the second, 12 from the third, 10 from the fourth, 4 from the fifth, and 34 new Chicano entrants in the sixth year. Thus, for 52% of these children this was their first year in the bilingual program. In the fifth grade there were also 11 Black children. Three had entered in the third year of the program, three in the fourth, one in the fifth, and four in the sixth year. 50% of all fifth graders were new to the bilingual classes.

The sixth grade classrooms included 4 children from the first year, 7 from the second, 9 from the third, 13 from the fourth, 10 from the fifth, and 17 new children. There were a total of 11 Black children: two from

the third year, none from the fourth, three from the fifth, and six new entrants in the sixth year. The total of Black and Chicano newcomers constituted 31% of the sixth grade bilingual classes.

Discussion of findings. To summarize the data on student achievement, we must face the fact that we experienced a number of serious disappointments. The extremely promising performances in the early years of the program were not maintained. In the last year there was indisputable evidence that the bilingual children were seriously below grade level in English language skills. They did make good progress in Spanish, but there was little success in achieving growth in the acquisition of Spanish by the non-Spanish students in the bilingual classes.

We cannot accept the facile explanation that this is the typical pattern found in many intervention efforts with disadvantaged children. This would place the major onus on the children themselves. The unfavorable comparisons with the "control" group is equally inappropriate. We know that there was no random selection of students, and that a number of children categorized as controls had "graduated" into the regular classrooms after two or three years in the bilingual program. Although the program had been designed as an experiment, it soon became clear that it was impossible to maintain the rigor required to test the hypotheses of interest. It was obvious that we were engaged in a developmental process, and that the major contributions were of a demonstration nature.

Among the most important insights gained from the bilingual project has to do with the issues involved in the delivery and implementation of an intervention program where there has been little or no participation of on-site personnel in the initiation or planning of the innovative approach. At our target school neither the Principal nor the teachers had shared in the excitement of suggesting solutions to improve the education of the large Spanish-surnamed population. The personnel brought

in to deliver the program experienced difficulty integrating into the regular school staff organization. In the beginning, the Principal and the regular teachers viewed the bilingual approach as an interruption to their accustomed routines. Many were hostile and resented the additional demands made upon their time and energies. It took a good deal of time and effort on the part of the Project Director to convince these dedicated and highly experienced school people of the potential value, to themselves as well as to the students, of a truly bilingual-bicultural philosophy. Once the program got under way and some of these benefits began to become apparent, acceptance and whole-hearted cooperation developed.

Even so, however, there continued to be a basic difference of educational philosophy and administrative policy. While the lack of continuity of students in the program was not completely attributable to this source - high attrition rates are a frequent problem in inner city schools - the deep-seated commitment of the Principal to the basic needs of all students led him to replace students who had attained a measure of English-language facility with newcomers who had very little experience with the language. This was particularly true in the early years of the program, before clear channels of communication and the identification of common concerns had been achieved.

Another set of problems resulting from the lack of early commitment to the bilingual concept was the inability to obtain appropriately-skilled bilingual teachers. Again, this was much more a function of the availability of teachers than it was of school or District attitude. On the whole, the District was happy to have the assistance of the federal government in the funding of the bilingual program. However, it was plagued with many much more immediate financial and administrative problems. The first two years had seen a complete reorganization of the system, with the

installation of the Unified School District. It was unfortunate that this shakedown period coincided with the initiation of our program. In the two closing years of the project, the District was faced with serious budget shortages, the necessity of closing down schools, and a turbulent teacher strike. There were also socio-racial conflicts which seriously disrupted the functioning of the target school on several occasions.

Looking briefly at the issue of teacher continuity, we find that there were nine bilingual teachers for the three grade levels carried for the last five years of the program. Only one of these, the fourth grade teacher, had been with the project since its inception. In the final year, the fifth grade bilingual teacher was new to the District but had had previous bilingual experience in a different program format. For the first term the sixth grade classes had a first-year teacher with no training in bilingual methodology. During the second term bilingual instruction in the sixth grade was carried out by the paraprofessional aides without a credentialed bilingual teacher in one of the sixth grade classrooms and a new bilingual teacher in the second.

Teacher attrition problems are common in schools in ghetto areas, and usually adequate replacements can be found. Turnover of teachers for the bilingual program created more serious difficulties. Very few teachers have had experience with bilingual education techniques. They require special on-the-job training before they can become effective in the classroom. Because funding each year was late, usually after the close of school in June, it was impossible to plan ahead and provide summer workshops or refresher courses before school opened in the Fall. And because of the high rate of teacher loss, the skills acquired during one year of participation in the bilingual experience were not cumulative. The lack of opportunity to build a solid base of bilingual teaching skills was a

serious handicap to effective program implementation.

There were other factors which contributed to the failure in achieving our most optimistic goals, and we have mentioned here only some of the most critical ones. We feel that we have learned a great deal from the course of developing and delivering our bilingual education orientation, and we would hope that future intervention projects avoid some of the pitfalls into which we have stumbled. Assuredly, some of the difficulties are inseparably tied to introducing innovative research into the "real" world of the school. But more time spent in plowing, harrowing, and fertilizing the soil would, we are convinced, result in a stronger, healthier growth from the seeds we attempted to implant.

But we should not close this section on assessment of student achievement on an entirely discouraging note. Let us point out that evaluations of this type look at averages, and ignore or "wash out" the individual instances of exceptional growth. There were many children who profited greatly from the bilingual program, many who will now be able to move ahead into the educational mainstream, who would without it have been the almost predictable drop-outs. The success with the comparative few is the true measure of the potential of a fully developed bilingual-bicultural approach.

Description and Assessment of Other Program Components. In this section we will touch briefly on the four essentials of an innovative program. These include Staff Development, Curriculum Development, Parent and Community Participation, and Program Dissemination. The various yearly Proposals for Program Continuation submitted by the Project Director to the School District and to the National Office of Education have explicated these plans in great detail. Also, the Auditor for the project has reviewed the accomplishments in these areas

critically, but with great insight. We recommend that these sources be referenced by those who wish more specific information in these areas.

Staff Development. An extensive program of staff training was instituted by the Project Director. Regular weekly meetings were held at the school. They covered a variety of specially relevant topics as well as the discussion of problems arising from the day-to-day functioning of the school and classroom. Among the areas covered were the development of instructional techniques and materials, evaluation and record-keeping activities, and interpersonal problems, especially those between regular and bilingual staff. For example, an important issue was the professional status of the aides, tardiness and absenteeism, and access to teachers' lunchroom and lounge.

The Director used a variety of innovative techniques in dealing with such problems. After taking a course in the Glasser technique, he introduced transactional analysis sessions into the training program. The project also arranged to pay for Berlitz Spanish courses for regular teachers who had become motivated to increase their effectiveness with their Chicano students.

These approaches were used with teachers and aides alike. For the aides, many of whom had completed only a secondary education, more intensive teacher training was needed. The Director arranged with the Compton Community College to teach a series of courses which could be credited toward a college degree. Aides were given financial assistance as well as released time to attend these classes. Over the six years of the program, a number of aides completed baccalaureate degrees and one aide fulfilled all requirements for a full teaching credential. Further encouragement for upgrading of teaching skills was motivated by financing attendance of teachers and aides at local bilingual education conferences.

Curriculum Development. An important part of the in-service training

for both teachers and aides was concerned with curriculum and materials development. Over the years, the Project Director has carried out an active curriculum effort. Detailed instructional syllabi are presented in the various Continuation Proposals. The most recent one (1975-1976) includes a complete K-12 curriculum outline in English and Spanish. Additionally, the Program Director has spent a great deal of his own time during his summer holidays visiting school systems in Spanish-speaking countries and in reviewing a large number of materials used in their programs. As a result, he has developed a rich set of resources in already published Spanish-language materials. These were made available in the school library as well as the project office. Since 1972, the Santillan materials, printed in Spain but prepared for Mexican and South American students, have been adopted for grades K through 6. These are described in detail in the Continuation Proposals.

Another extremely valuable curriculum resource developed from an extended school-and-community effort. Through the cooperation of the art teacher at the high school, groups of students in art classes collaborated in the preparation of a dramatic mural depicting the course of Mexican-Spanish history. This mural has served as a focus for the global-integration approach used in many of the instructional sequences.

Parent and Community Participation: One of the most successful components of the Compton Bilingual-Bicultural project has been the awakening of a sense of pride and hope in the Chicano community. This applies not only to the population in the immediate vicinity of the target school but also to the entire City of Compton. Through struggles to achieve a common goal many many landmark achievements were effected. Compton became the first (perhaps only!) city in the United States to recognize Cinco de Mayo as a school holiday. The City of Pueblo in Mexico was recognized as a sister city, and each year members of each community exchange visits and

share the richness of their different cultures. The parent advisory council has grown into an active, community-wide Comité, with educational interests far broader than the target school. Members of the Comité attend the regular School Board meetings and make sure that the needs of their children are given appropriate consideration.

Program Dissemination. Although this component was not included in the original plan, it has developed almost spontaneously as more and more people have heard of the work being done in this community. The Project Director has made many presentations at special workshops, over radio and television, and has had numerous press releases describing the teaching activities at the school. Also, progress reports have been made at various professional conferences.

Many visitors have come to Compton to observe the bilingual classrooms. We have had several from Mexico and South American countries as well as a few from Europe. All our visitors have gone home enriched by their experiences and filled with new ideas to apply to their own educational problems.

There are many other subjective indications that the program has made an important impact, and that ripple effects will continue for many years to come. We should not allow a preoccupation with quantitative data to obscure these significant human outcomes.

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